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THE

PRINCIPLES of SURGERY

VOLUME II, PART II,

CONTAINING,

The ANATOMY, and PATHOLOGY,

OF THE

SKULL, & BRAIN,

IN

The FORM of DISCOURSES

ON

THE STRUCTURE & DISEASES OF THE SCULL; THE STRUCTURE & DISEASES OF THE BRAIN; ON APOPLEXY, PALSY, HYDROCEPHALUS; PHRENZY, THE VARIOUS SPECIES OF FRACTURES OF THE SCULL, AND THE OPERATION OF TREPAN.

BY

JOHN BELL, SURGEON.

"Enter his chamber, view his breathless corpse,
And comment then, upon his sudden death." *Shakespeare*

J. Bell invent, et del. *J. Neagle Sculp.*

LONDON

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THE

PRINCIPLES OF SURGERY,

VOLUME II. PART II.

TO

GEORGE WOOD, ESQ.

SURGEON,

THIS VOLUME, ON THE PATHOLOGY OF THE BRAIN,

IS PRESENTED BY

THE AUTHOR,

IN TOKEN OF RESPECT FOR THE PROFESSIONAL TALENTS,

AND STERLING SENSE, WHICH HE INHERITS;

AND THE AMIABLE AND GENTLEMAN-LIKE MANNERS,

WITH WHICH THOSE HIGHER ENDOWMENTS

ARE ADORNED.

TO

GEORGE WOOD, ESQ.

SURGEON,

THIS VOLUME, ON THE PATHOLOGY OF THE BRAIN,

IS PRESENTED BY

THE AUTHOR,

AS A TOKEN OF RESPECT FOR HIS PROFESSIONAL TALENTS,

AND AS A LASTING MEMORIAL OF FRIENDSHIP.

AND THE AUTHOR, AND GENTLEMAN HE MARRIES

DISCOURSES

ON THE

DISEASES AND INJURIES OF THE HEAD.

SECTION I.

PRELIMINARY DISCOURSE ON THE ANATOMY OF THE CRANIUM, AND THE RULES OF PRACTICE DEDUCED FROM IT.

IF ever learning has retarded the progreſs of ſcience, it has been in our profeſſion. Phyſicians devoted to ſcholaſtic learning, ſecluded by the falſe dignity which they aſſumed from the actual practice of our art, and from all the ſources of true knowledge, have actually been the authors of theſe aphoriſms and rules which guide the ſurgeon in his moſt important duties, and which hold an influence over the profeſſion even to the preſent hour. Moſt unfortunately for ſcience, Hippocrates wrote with ſuch truth and brevity, with ſo ſound and diſcerning a ſpirit of obſervation, and recited ſo carefully the ſigns of danger in all kinds of wounds and injuries, that he has been held in continual reverence; his aphoriſms have been held ſacred in all ages; and no one has followed him with any more liberal deſign, than that of writing tedious and ſpiritleſs comments on his doctrines. Such were the only ſtudies of the middle ages; ſuch comments formed the ſole occupation of the famous ſchools of Alexandria and Salerno, and of all the univerſities of Europe during the laſt century; ingenious Scholia, on the words, rather than the ſenſe and ſpirit of Hippocrates, exerciſed the ſubtilty of the celebrated teachers, and a vain and ſcholaſtic learning uſurped the place of real ſcience. Hence it has come to paſs, that through all the voluminous writings on fractures of the ſcull, but one ſole doctrine prevails, and one code of rules, deduced not from any conſideration of the eſſential injuries of the

brain itſelf, but from the configuration, ſtructure, and function of the cranial bones; the ſigns of danger, the prognoſtics and the rules of practice, being allied, not with the internal diſorder, but with the form and circumſtances of the fracture, and the mere injury of the bone. Many ages paſſed thus in the unprofitable ſtudy of books, to the utter neglect of practice, and ſcience, in place of being enriched by new facts, was encumbered with the uſeleſs parade and pomp of learning. Books were written not to improve the art, but to blazon the talents of the phyſician who compoſed them, and with a quaintneſs and formality calculated for that ſole purpoſe: Books in our ſcience, like thoſe on theology, were full of endleſs diſtinctions, diviſions, and ſubdiviſions; and ſuch as remain, or are diſtinguiſhed, ſeem to me a ſenſible repreſentation of the eſſential forms of Ariſtotle, a ſhape without ſubſtance. I will not condemn you to wander with me through this deſart and ſterile region, nor rehearſe to you all the follies of thoſe credulous and doting ages; I ſhall not, though it has been a neceſſary duty in my own courſe of ſtudies to peruſe theſe lifeleſs pages, impoſe the ſlighteſt part of the ſame labour upon you: but if there is to be found in this maſs of antique learning any thing really precious, if there be any explanation of the prejudices and errors which ſtill exiſt, if there be alluſions to modes of practice not yet entirely diſuſed, if the rude conceptions, and ſtill ruder operations of the old ſchool, can ſerve to regulate your opinions, or help to reform ſome points of modern Surgery; if, in ſhort, there be any thing pleaſant, or profitable, or uſeful, in this kind of learning, it ſhall be my chief care to ſelect ſuch examples of ancient doctrines, or operations, as may prove intereſting to you, and confront them with the opinions and practices of our own times.

A ſlight ſketch of the ancient doctrines will ſuffice, and will enable you to enter with alacrity on the eſſential ſubject of your ſtudies, inveſtigation of the diſorders of the brain itſelf, and the means of relief, unperplexed by futile diſtinctions, and ſcholaſtic terms. You will, by being made to feel the vanity of learning, attain to a free uſe of your own good ſenſe, and natural reaſon; you will be induced to act with reſerve and modeſty in all your operations, holding in abhorrence that unlimited uſe of inſtruments, that impatient deſire of doing ſomething, of mangling the integuments, and ſcraping and trepanning the ſcull, which was the proudeſt work of the old ſurgeons, and the moſt diſguſting feature in their practice: you will alſo perceive with pleaſure, that modern ſurgeons, leſs learned, and more ſkilful, than the ancients, have, in place of authority, taken plain ſenſe and reaſon for their guide; but they have perhaps unwiſely neglected the ſtudy of thoſe authors whoſe original doctrines, or learned comments, have given a peculiar complexion to our ſcience, and ſometimes thrown diſcredit on the moſt precious rules of practice by an unaccountable mixture of ignorance and folly, with ſound obſervation and ſterling ſenſe.

There are difficulties in the way of improvement of which you are little aware, and you cannot know how pleaſing it is to enter on the eſſential parts of ſtudy with a clear unbiaſſed judgement. The books we read, the languages from which we tranſlate, the terms we uſe, and the miſapprehenſions thoſe terms ſometimes convey, are all adverſe to the cauſe of truth and ſcience. It is not poſſible that ſcience ſhould have deſcended through ſo many centuries, without being ſtained and tainted with every prejudice which the caprice and weakneſs of individuals, or the falſe learning of paſt ages could produce. Such ſpecks and imperfections are not to be eaſily removed, and profeſſional authors have been at little pains to remove them; books are copied from books, and the new theory is engendered upon the old; ſingular and wayward opinions naturally ariſe from unlooked-for recoveries, or unexpected deaths, and are recorded and perpetuated; and an author who allows his mind to be entangled, and his judgement biaſſed by partial and accidental cauſes of ſucceſs or diſappointment, imagines that his own caſes are alone important, while they are mere exceptions to ſome more general fact, and imagines it a duty to maintain his peculiar tenets with enthuſiaſm and zeal, careleſs of their harmony with the general ſtate of ſcience.

It is neceſſary and uſeful, before we enter on more ſerious duties, to give a general ſketch of the principles of our ſcience, to reconcile diſcordant doctrines, "and to blow away the miſts which thicken from time to time over the face of truth." It will ſurely be pleaſant to you that I enable you to read every ancient and modern book without any danger of having theſe principles diſcompoſed, to know the complexions of our ſcience through all its ſtages, and to aſſign to each age its prejudices, to each individual author his own extravagance and follies. Should I neglect to help you through this taſk, you would be delayed even in the firſt ſteps of your progreſs, and would feel how hard a thing it is to diſtinguiſh truth from prejudice, learning from ſcience, the capricious opinions of individual authors from the eſtabliſhed precepts of the art; what doctrines to approve, what narratives to believe, or to what maſters you might ſafely yield up your judgement, or from whom receive the rules that are to guide your practice. Look into the books of the ancients, and you would believe that every capillary fiſſure were attended with peculiar danger, and that, without the moſt adventurous operations, the patient could not live. Turn again to the books of modern authors, and you would be perſuaded, that "the more violent the fracture, the leſs the danger*;" that your patient, though he lie in a deadly ſtupor, with fractures of the ſcull, or deep wounds of the brain, needs but to lie undiſturbed, and unaſſiſted, to enſure its perfect recovery. Name me one abſurd or cruel meaſure, the ampu-

* Muſitani, Garengeot.

tation of large pieces of the ſcalp, the ſcraping of the ſcull, the widening of fiſſures, the perforating the cranium with many trepans, and opening the dura mater, or even encircling the whole of the ſcull with trepan holes, for every idle ſuſpicion, or imaginary purpoſe, name me an extravagance or cruelty for which the man of books will not bring you forth precedents. If you adhere to one author, you are inevitably wrong; if you read many, you are bewildered; and indeed a whole life ſpent in practice will hardly teach you to reconcile facts, or to attain that ſteadineſs of temper, and maturity of judgement, which ſhould carry you through your profeſſional duties with confidence and peace of mind. If theſe things be true, it is ſurely implied, that you muſt be aſſiſted and directed in your firſt ſtudies, and that the principles of the ſcience, and the rules founded on them, are to be deduced from a wider range of ſtudy than falls to the lot of every reader, and a knowledge of actual practice which the ſtudent cannot have.

The chief object of your ſtudies muſt be, to learn the ſigns and cauſes of danger, and to judge wiſely of the motives which ſhould induce you to operate. We have not, as in former times, one man of ſuperior abilities, and higher education, whoſe province it is to reaſon, judge, and decide, and another of meaner and more mechanical talents, to perform what he directs. The duties, the privileges, and the education of the ſurgeon, are enlarged; the head, which decides on the ſigns of danger, guides the hand which is to bring relief. The ſurgeon is not a mere operator, for, if he were ſo, experience, knowledge, and ſound judgement, would be of no avail: if he were the abject and humble attendant which he was in thoſe days, when phyſicians taught him how to operate, and directed him in every ſtep, he might perform his part of duty, the mere operation of trepanning the ſcull, the day he entered on practice with ſufficient dexterity, and there an end of all ſtudy and improvement. But he muſt be a reaſoning, thinking man, who is to decide for himſelf, and for his patient, the moſt momentous queſtions, judging of wounds and injuries, as the phyſician judges of diſeaſes, by a knowledge of the internal ſtructure, by outward ſigns implying ſome inward phyſical change, by reaſoning, experience, and the precedents of ſimilar caſes.

What is this operation of trepan, that it ſhould have ſo occupied the attention of the learned in all ages, and that its ſlighteſt difficulties ſhould be the ſubject of ſo many volumes? Is it a delicate operation, or really difficult to perform? Is it difficult to cut up the ſcalp with proper inciſions, to bare the bone of its perioſteum, to trepan or ſaw the ſcull, in order either to give vent to blood, or matter effuſed under it, or to raiſe up any portion of the cranium that is depreſſed? By no means; there is in theſe operations nothing formidable, nor any thing which the moſt unſkilful could not eaſily, I fear too eaſily, perform. The difficulties which

perplex the ſurgeon, and which may well diſcompoſe the moſt judicious and ſkilful, are of a very different nature. It is a well eſtabliſhed fact, that often the patient, who lies in the deepeſt ſtupor, revives, (after a long interval, and without our help), to the perfect recovery of ſenſe and reaſon; but had we in that interval, performed any operation, we ſhould have aſcribed his recovery to art. It happens ſtill more frequently, that the perſon who ſeems the moſt ſlightly hurt, who has no mark of injury, or only the moſt inſignificant tumour of the ſcalp, who has never from the time of the blow had one moment of inſenſibility, of ſickneſs, or of pain, has yet ſuffered ſuch an injury of the bone itſelf, or ſuch a ſeparation of the dura mater from within, as cauſes in the end an abſceſs of the brain; the patient is ſeized, after a deceitful interval of eaſe, with ſlight nauſea, tremors, languor, and confuſion of head; but ſo inſiduous and ſlow are the approaches of this kind of danger, that the ſurgeon is hardly aware of it, before the patient is paſt all human aid, and no operation could ſave him.

Such is the uncertainty of thoſe ſigns; ſo often does our patient fall ſuddenly into ſlight paralyſis and faints, and expires while we apprehend no harm; ſo often does he revive from that ſtupor which ſeems to ariſe from extravaſated blood oppreſſing the brain; that the diligent inveſtigation of the true ſigns of danger, of the cauſes of oppreſſion, or ulceration of the brain, and of the various motives for operating in theſe injuries of the head, (a ſevere and complicated ſtudy), ſhould be the chief occupation of the ſurgeon. But it has not been ſo;—operations have been more ſtudied than the means of avoiding them; the aphoriſms of Hippocrates, and the bloody code of practice founded on them, have been implicitly copied into modern books.

If the ancients have been the chief founders of medicine, which I greatly doubt, I know very certainly, that in ſurgery they have done infinite and almoſt irreparable harm. Their aſcendency in poetry and the fine arts I willingly allow; but how could they excel in medicine, much more in ſurgery, who knew ſo little of the ſtructure of the human body, and made ſo unwiſe a uſe of what they knew. Look into their books, and you would believe that the anatomy of the brain or dura mater, the inflammation of its membranes, or the ſtate of its circulation, had no relation to injuries of the head. For the ancients, whoſe obſervations, as a firſt ſtep in ſcience, we may ſafely admire, and the old ſurgeons, or rather the old phyſicians, the commentators and ſcholiats, whoſe abſurd learning we cannot but deſpiſe, were not anatomiſts. Phyſicians were little accuſtomed, till after the age of Veſalius, with diſſections of the human body, ſound or diſeaſed. The doctors of the ſchools never inveſtigated the cauſes of death, by diſſecting the recent body, never ſwerved from the firſt authorities of Hippocrates, and of Galen, his earlieſt commentator; their beſt preparations were the ſpoiled bones of graves and charnel-houſes; they ſtudied nothing but the bare and

naked ſcull; they called this Anatomy, and ſpared no pains to make this Anatomy uſeful.

We cannot wonder that, their ſpeculations in anatomy being thus limited, their remarks were of the moſt trivial nature, and yet of the moſt dangerous tendency. They ſat ruminating in their cloſets over thoſe curious ſculls, and numbered their proceſſes, and deſcribed their ſutures; remarked the irregularities in the thickneſs of the ſeveral bones, and imagined a ſet of ſurgical obſervations ſuited to theſe deſcriptions; obſervations which, though inceſſantly repeated by ſyſtematic writers as leading to important concluſions, are ſuch as no ſenſible Anatomiſt, nor practiſed Surgeon, would think of acknowledging. They were chiefly employed in remarking how wiſely nature had provided againſt the extenſion of fractures by the interpoſition of ſutures, (for ſtill the mere fracture ſeemed to them the principal danger); how the interpoſition of oſſa triquetra, and ſeparate and leſſer oſſifications, occaſioned ſuch aberrations of the ſutures from their regular place as might lead to unpleaſant miſtakes; how the ſagittal ſuture ſometimes extended beyond the coronal quite to the root of the noſe; how flat the ſquamous ſuture was, and how likely, from its want of a ſerrated or ſerpentine form, to be miſtaken for a fiſſure; and how all the ſutures were apt to be obliterated in old age. They obſerved the difficulty, or rather danger, of trepanning the frontal ſinus, for they deſcribed it as dangerous, and maintained that ſuch a perforation could never heal; how the ſpine which runs along the inner ſurface of the frontal bone, and the irregularities of the occipital bone, prevented the ſurgeon ſawing entirely through thoſe parts of the ſcull, without endangering the dura mater. They marked, with eſpecial care, the general ſtructure of the ſcull, conſiſting of two tables, and intermediate cancelli, for the ſake of encouraging the young ſurgeon, with this remark, that the flow of blood, and the change of ſound, when the cancelli are lacerated by the ſaw, announce to him his having ſawed entirely through the outer table; and, finally, they deſcribed various peculiarities of the ſutures, (eſpecially their place, and ſerrated form), which might ſerve to diſtinguiſh them from genuine fractures of the cranium.

Thus did theſe learned phyſicians, (for they were not ſurgeons), attempt, very aukwardly, and with wonderfully little ingenuity, to combine anatomy with ſurgery, and accumulate a ſet of quaint and puerile obſervations, which ſerve but to miſlead, and are fitter to be altogether expunged, than to be thus honourably recorded; for they teach the tyro in ſurgery only how to operate, and that not well; but by no means do they teach him that which is alone important, how to diſtinguiſh danger by its ſigns, or to think of what he is doing, when perforating the ſcull. Theſe remarks begot a paſſion for operating, which time has not entirely ſoftened; they have been copied with all the idle pomp of learned quotation into every modern book; I appeal to you, gentlemen, how much you have heard,

how much you have read, about ſutures and fiſſures, and fractures; about the ſinuſes and the cancelli, the tabula vitrea, and the various irregularities of the thickneſs and thinneſs of the ſcull; and, along with thoſe doctrines, came a rude and barbarous ſyſtem of practice, that of ſcraping fiſſures, of trepanning fractures, of repeating the application of the trepan over a great ſurface, of cutting entirely away whatever parts of the ſcull ſeemed depreſſed, of tearing away whatever ſeemed looſened, of uſing ſaws and terebræ of various forms, when the trepan ſeemed too tardy in thus opening the ſcull, and expoſing the brain!

Thoſe who, on the revival of learning, aſſumed the weary taſk of explaining the firſt writers on medicine, were not men of practical ſkill, but philologiſts, commentators, men of mere learning; and they commented beſt, moſt learnedly, and indeed moſt ſuitably to the text, who ſhewed themſelves moſt ingenious in multiplying the diſtinction of fractures; as thoſe were thought to operate beſt, who found means of applying the greateſt number of trepans to one ſcull. Neither time, nor the authority of great names, nor the learned languages in which thoſe authors wrote, can conſecrate thoſe follies: The great antiquity and high authority of theſe rules, are indeed the cauſe why I ſhall be at more than uſual pains to refute them. Theſe ſelect obſervations and precepts are, by preſcription and time, become a part of our profeſſion; they are ingenious; they ſeem to enſure the natural and eſſential connection of anatomy and ſurgery with each other; they have an impoſing appearance, and lay ſtrong hold on the imagination of the young ſtudent; they are the leſſons the firſt learnt, and the moſt difficult to unlearn, and men who have paſſed with honour through all the gradations of ſtudy, and ſpent years in the ſucceſsful practice of the profeſſion, continue to reſpect theſe obſervations; thoſe even who have, when emergencies required it, perforated with equal indifference, all parts of the cranium, cannot refrain from mentioning the interdicted points, where the trepan ſhould not be applied. But of all the leſſons of the old ſchool, the one moſt dangerous to the young ſurgeon is that which teaches how to diſtinguiſh fiſſures from ſutures; for the rules for diſtinguiſhing fiſſures clearly imply, that wherever ſuch fiſſure is proved to exiſt, it is allowable, it is neceſſary to trepan the patient; and thence a fracture of the ſcull, and the neceſſity of trepanning the injured part, are ſo inſeparably connected in the ſurgeon's mind, as to form the moſt eſſential rule in his practice.

In ſurgical ſyſtems, I do not know any two arrangements more irrational, or more exceptionable, than theſe two: Firſt, That in treating of amputation, the ſubject is always opened with a diſſertation on gangrene, as if the fear of gangrene, or its actual exiſtence, were the ſole motive, or at leaſt the moſt frequent, for amputating a limb. Secondly, That in explaining the operation of trepan, the ſubject is invariably introduced with remarks on the ſutures, the cancelli, the variable thick-

neſs of the cranial bones, and the many ſcholaſtic diſtinctions of capillary fiſſure, fractures, depreſſions, and depreſſed fractures of the ſcull, as if ſuch fracture or fiſſure were the ſole motive, or the moſt prevailing one, for applying the trepan. This, you muſt be ſenſible, is a ſyſtem full of danger, where attention to the anatomy of the ſcull teaches the young ſurgeon to be curious in diſcovering fractures, and where every trivial remark ſeduces him, by inſenſible degrees, into a fondneſs for operation. No; this is not the meaning of our operation; we often perforate with the trepan, to give vent to purulent matter, often to give vent to extravaſated blood, ſometimes on account of a depreſſion of the bone, ſometimes to cut away ſharp points which may hurt the brain or membranes, or to take away balls or foreign bodies nitched into the ſubſtance of the bone, but never on account of mere fracture of the ſcull.

Firſt, You are deſired to remark the conſtitution of theſe flat bones, "that they are compoſed of two tables or plates of ſolid bone, with intermediate cancelli, (or cellular ſubſtance, ſuch as is natural to bone, full of blood-veſſels), which bleed when with your trepan you have ſawed through the outer table, occaſioning at the ſame time a change of ſound." This, though occaſionally modified, you are taught to regard as a rule of practice; and, in every elementary book, you find it to be a moſt important ſubject of debate, whether, in perforating the ſcull, you ſhould uſe the trephine, which ſaws rapidly, or the trepan, which, from making only half circles, cuts more ſlowly; or whether you ſhould firſt uſe the trephine, till you have cut down to the cancelli, and finiſh the more delicate part, the ſawing off the inner table with the trepan.—Never, perhaps, was any remark more unfortunate than this, which refers the ſurgeon to the bleeding and the change of ſound, as ſigns of having cut through the outer table, and teaches him to be proud of ſawing rapidly. Of all operations, this is the one where precipitancy and hurry has the feweſt apologies, ſince the patient uſually lies inſenſible, ſince the ſawing of a bone occaſions no pain, ſince the trepan is an operation where haſte may occaſion the moſt diſmal conſequences, from wounding the dura mater, which, when left uninjured, ſupports the brain, (after the removing of a piece of the cranium), like a ſecond ſcull.

This reminds me of that paſſion, ſo conſpicuous of late years, for inventing inſtruments which will enable the operator to ſaw more rapidly; but, in my poor opinion, thoſe who complain moſt loudly, are thoſe only who know not how to uſe the common inſtruments. I have ſeen an operator ſo conſummately ignorant, as to turn his trephine againſt the ſet of the teeth, and wonder how he got on ſo ſlowly, and call for another head for his inſtrument, believing it blunt. I am perſuaded that thoſe who will be at pains to learn the uſe of the trephine, will find, that a well-ſet ſaw, turned with the hand, works, as rapidly as the judgement can guide it. With what unhallowed precipitancy this moſt dangerous operation is ſometimes performed, I need not repreſent invidiouſly, by ſaying, that I have ſeen the dura

mater wounded, that I have by me preparations in which it is entirely divided by the trepan. The fault is acknowledged by ſurgical writers, with a want of delicacy, with a degree of levity and inhumanity, which is hardly to be endured. Mr Hill, once in performing the operation of trepan on a boy of eleven years of age, continued to turn the ſaw after the bone was cut through; he at laſt withdrew his trepan, looked anxiouſly for the circular piece of bone, imagined he ſaw it lying in the perforation, moving with the motions of the brain, tried with his forceps to pick it out, but in vain, for it ſeemed to ſink with each ſyſtole, and ſo elude his graſp. "Upon this, another gentleman thruſt the end of a ſmall ſpatula at the under ſide of it, to prevent it from ſlipping under the ſcull, and likewiſe with a view to turn it out; but he was likewiſe diſappointed. After all theſe attempts, the piece of bone, to our great ſatisfaction, (ſays Mr Hill), was found ſticking in the head of the trepan. What, by candle-light, ſeemed to be the bone, was only the white dura mater, with a *red circular pricked line upon it*, occaſioned by its pulſation againſt the teeth of the ſaw, during the ſlow working.

"When we began to recollect ourſelves, we *could not but ſmile* at the ridiculous panic we had been thrown into, and that ſo many people ſhould have been under the ſame deception, which was owing to the dura mater's ſubſiding ſo far."

"A red circular pricked line upon the dura mater" of a living perſon! With whatever air of indifference this may ſeem to be related, I intreat that it may make no other impreſſion upon your minds, than as an act of imprudence not to be pardoned; though that operator ſmiled, you I hope will be ſerious, for I do ſincerely believe ſuch a wound, in its moſt uſual conſequences, the moſt deadly that a raſh hand could inflict *.

Secondly, But this firſt ſuggeſtion is inconſiſtent with a rule much more worthy of notice; viz. that "in all circumſtances the ſurgeon ſhould ſaw cautiouſly, on account of the incalculable irregularities in the thickneſs of the cranium, which is univerſally thin in boys and very aged people, and is, during all the middle ſtages of life, extremely irregular, generally thick, but at certain points extremely thin, or excavated by the deep impreſſion of tortuous veins." I approve of ſawing the cranium, in all circumſtances, with prudence and deliberation; but yet I diſcover, in all theſe rules, intrinſic marks of their having been invented by mere ſpeculators in ſurgery, not by ſurgeons; and in the caſes I have juſt related, I find proofs of Turner and

* Such raſhneſs is, I fear, not very rare, and many have thus injured the dura mater, for one who has the honour or courage to confeſs it. "I remember (ſays Turner) that in the firſt little one I trepanned, an accident of this kind befel me, and put me, as well as the warden who ſtood by me, into great conſternation; for, miſſing the piece, we were fearful, finding a rent in the craſſa-meninx, that it was fallen in upon the brain; till, further recollecting, and taking up the inſtrument I had been working with, I found it faſt ſhut within the bone." —Turner, p. 288.—Faſt ſhut in, becauſe they uſed crowns of a conical form.

Hill buſy trepanning where there was nothing to vindicate ſo decided a meaſure; for in truth we almoſt never operate in a mere fracture of the ſcull; we almoſt never operate where the bone is ſound, and the dura mater cloſely attached to the bone; even in caſes of extenſive fracture, we operate only on account of ſome affection of the brain. The dura mater, for example, has by the ſhock been ſeparated from the ſcull, widely ſeparated, and a quantity of grumous and black blood lies betwixt the dura mater and ſcull; or, the bone having been deadened by a blow, has loſt its circulation, a tumour has ariſen over the injured part, the patient begins to complain of ſickneſs, languor, trembling of the hands, and confuſion of head, which ſhews that pus is forming upon the ſurface of the dura mater, and oppreſſes the brain; when we cut into ſuch puffy tumour, we find the bone dry, diſcoloured, and without circulation; and when we apply the trepan, the matter flows through the trepan-hole from under the cranium. Thus the connection of the ſcull with the dura mater is diſſolved, pus or coagulated blood fills the interval, and (though we ſhould in all caſes operate deliberately and cautiouſly) whenever we operate in caſes truly requiring the trepan, the dura mater is depreſſed by blood or pus, and is in no danger even from the raſheſt hand, though ſometimes the worſt ſymptoms ariſe from a very thin cake of extravaſation, or a mere diſcolouring without any great effuſion of pus.

Thirdly, The artery of the dura mater is deſcribed with a particular reference to the operation of trepan. "As an artery of conſiderable ſize, the chief artery of the dura mater, running along the inner ſurface of the parietal bone, marking the anterior corner of the bone with its trunk, and the upper part with the impreſſion of its branches, and making a groove ſo deep, that the bone cannot be entirely cut through by the trepan, without the artery being divided. For theſe reaſons it is adviſed, that the ſurgeon ſhould avoid the whole tract of this artery, and eſpecially that he ſhould not trepan the lower corner of the parietal bone." That the ſurgeon ſhould, except in caſes of the moſt abſolute neceſſity, avoid even the ſhadow of danger, is a precept from which I will not allow myſelf to diſſent. But in this, as in all theſe notable obſervations on the cranium, there are ſtrong intrinſic marks of the reflection coming from one little acquainted with practical ſurgery; for in all circumſtances, and on all points of the ſcull, have I ſeen the trepan applied without much ſkill, or any thing of this foreſight, but never have I ſeen or heard of a hemorrhagy from the artery of the dura mater.

In all caſes it muſt be, that either the dura mater is detached from the inner ſurface of the ſcull, or it is not detached! If the dura mater be detached from the ſcull, and you apply the trepan on account of extravaſation, the artery, as it belongs to the membrane, muſt be depreſſed along with the membrane, the interſtice being filled with blood, and the artery entirely removed from the reach of the inſtru-

ment. If the dura mater be not ſeparated, and you are uſing the trepan on account of mere fracture, and with the deſign of cutting away thoſe points of the fractured bones which might injure the membranes, or for raiſing any depreſſed portion which may oppreſs the brain, even if you did touch the artery of the dura mater, there could be no great nor dangerous hemorrhagy. The artery is ſmall, there is no cavity nor cellular ſubſtance to hide its bleeding orifice; it muſt appear at the edge of the trepan-hole, and muſt ceaſe bleeding ſpontaneouſly, or be ſtopped merely by applying a little bit of lint, preſſing at the ſame time ſlightly with the point of the finger. Therefore, although much has been ſaid about this dangerous artery, lodged ſo deep in a groove of the parietal bone, although the French Academy actually invented an inſtrument with two blades ſcrewed together, one of which was to be laid under, and another above the bone, or propoſed, in place of this, to uſe a piece of ſheet-lead, which, being cut into a proper ſhape, was to have one end laid under, and the other doubled over the bone; whatever ingenious remarks or cunning inſtruments may have been imagined for ſuppreſſing this kind of hemorrhagy, I believe the whole to be a ſpeculation of the cloſet, ſuch hemorrhagy being extremely rare.

Fourthly, You are warned of the danger of wounding another important veſſel, which has greatly alarmed theſe buſy ſpeculators,—the Longitudinal Sinus. You are told, "that the longitudinal ſinus is the greateſt vein of the brain, named longitudinal from its running along the whole length of the ſcull, and changing its name at the occiput, where it forks into the branches which terminate in the great jugular veins, and are called the lateral ſinuſes." When phyſicians were framing conjectures, and amuſing their pupils at lecture, or adorning their books with obſervations, this conſpicuous blood-veſſel could not eſcape obſervation; it was never doubted, that the wounding a vein which conveyed ſo vaſt a proportion of the blood of the head muſt be fatal; and that this conjecture might loſe nothing of its value, it was ſet down as a very abſolute rule, "that the ſcull ſhould never be trepanned in the line of the ſagittal ſuture, under which this ſinus lies."—You are told that ſuch wound is fatal *.

* Speaking of the longitudinal ſinus, De Goerter ſays, "Ex quo ſi rumpitur, funeſta ſanguinis profuſio oritur." And this is in the Chirurgia *Repurgata*. Heiſter ſays, "Qui facile, ac non ſine magno periculo, hic læditur,"—"quem perrumpere peſtiferum eſt."

It is indeed admirable, that Rehault, in the Academy of Surgery, in quoting authors on this ſubject, quotes ſo induſtriouſly in behalf of his own ſide of the queſtion, that he quotes Berengarius firſt, and then Carpenſis, as both agreeing in the ſame ſolicitude about the application of the trepan on the ſutures. There was little danger indeed that they ſhould diſagree, unleſs they had been of the humour of John Lilburn, whoſe epitaph runs thus:

This was a goodly conjecture, and theſe accurate deſcriptions were ſubjoined for the ſame reaſon that Corporal Trim puts a date to his ſtory of the ſeven kings of Bohemia, " to make it look well in the face." This is none of the ſurgeon's rules, who, if he had at all mentioned the longitudinal ſinus, would probably have obſerved how ſluggiſhly the blood moves along in this great ſinus; that it is more properly a reſervoir than a vein; that there ſurely could be little danger in wounding it; that often when we find it neceſſary to operate in the direct courſe of this canal, we feel it turgid under the finger, that in ſuch a caſe the temptation is too ſtrong, not to be yielded to, of ſtriking the bleeding lancet into it, with the hopes of relieving the patient from the lethargy in which he lies. Warner and Pott have both ſeen the longitudinal ſinus punctured by fragments of bone, and the blood flowing from it profuſely, which was yet more eaſily ſtopped than that flowing from a vein, merely by applying to it a piece of dry lint. Pott and Warner have both, without ſcruple, opened the ſinus with a lancet, and bled the patient from it *.

" Is John departed? and is Lilburn gone?
Farewell then both to Lilburn and to John;
Yet, being dead, take this advice from me,
Let them not both in one grave buried be;
Lay John here, and Lilburn thereabout,
For if they both ſhould meet, they would fall out."

* R. J. aged 13, on the 16th November 1749, was ſtruck with a pointed piece of iron upon the upper and middle part of the head, ſo immediately upon the ſagittal future, as to force a bit of both parietal bones into the longitudinal ſinus. Immediately upon receiving the blow, the boy fell down, and became ſenſeleſs; but in a few minutes afterwards he recovered, and continued well for ſix days. At the end of that time, he was ſeized with epileptic fits, the returns of which were very frequent, accompanied with vomitings, and a palſy of the left ſide (Hemiplegia); the ſight of his left eye was perfect, but his right eye was ſo affected, as to make all ſingle objects appear double to him. Theſe ſymptoms continued till the 27th of December following, when he was put under my care. Upon examination, I found the circumſtances as deſcribed above; and immediately afterwards I proceeded to the operation. Upon taking off the ſcalp, there iſſued a continued ſtream of blood from the hole made through the bone; I applied the trepan ſo as to include the injured part of the bone, and the ſagittal ſuture within the crown of the inſtrument. Upon taking out the circular piece of bone, there appeared a wound which was made into the ſinus by the bits of bone that were then ſticking in it, which I enlarged with a lancet, in order to extract them with leſs violence. Upon taking out the bits of bone, the diſcharge of blood was increaſed; but, upon the application of dry lint, the hemorrhage ſtopped. Immediately after the operation, the patient fainted, but ſoon recovered. In half an hour's time, he expreſſed an agreeable ſenſation on his left ſide; and, by the next morning, he had ſo well recovered the uſe of his limbs, as to be able to remove them freely to any part of the bed, &c.——Vide Warner's Caſes, p. 10.

A girl, aged 16, was knocked down by her mother with an iron poker of conſiderable weight; the latter immediately ran away, and the former was brought ſenſeleſs to the hoſpital. She had a large wound on the top of her head, with a conſiderable fracture of the ſagittal ſuture. The broken pieces were ſo large, and ſo looſe, as to be eaſily removeable without any perforation. When they were taken away, the longitudinal ſinus was left bare, at leaſt two inches in length; but no hemorrhage followed the removal of the fragments.

Caliſen, the celebrated Daniſh ſurgeon, having trepanned a ſailor who was knocked down by a block falling from above, felt the ſinus lying turgid under the finger, and ſeeing no proſpect of the oppreſſion in which his patient lay being relieved, bled him from the ſinus with as little concern as he would have done from the jugular.

Calliſen, like other innovators, having fallen upon this trivial obſervation, was reſolved that it ſhould loſe nothing of its value, and accordingly he had the confidence to propoſe, that in epilepſy, madneſs, delirium, and in high fever, the ſcull ſhould be trepanned, in order to reach the longitudinal ſinus; but we have not heard that any ſurgeon has choſen to diſtinguiſh himſelf by an experiment of this kind. I need not enumerate the many facts by which men engaged in actual practice have corrected this ſurgical conjecture. But I cannot refrain from ſaying, that conjecture ſhould be confined to medicine, when you can do little elſe; for, were this rule for example reſpected, the ſurgeon would be obliged to refuſe his help in thoſe very caſes which moſt eſpecially call for it, ſince a fracture on the top of the head implies that it is produced, not by any ſide-long fall, or common blow, but by a very deſperate and perpendicular fall, as from a building, or from a yard-arm on board of ſhip, or by ſtones or beams falling perpendicularly upon the head, a fracture which, more than any other, requires trepanning.

Fifthly, I am now to ſpeak of a rule more purely hypothetical than any I have yet commented upon. The dura mater was ſuppoſed by the ancients to paſs through the ſcull by the indentations of the ſutures, not merely to connect itſelf with the pericranium, but to form that membrane, and from thence was ſuppoſed to be derived all the membranes of the body.

The name of Craſſa Meninx, or Dura Mater, was derived from this imaginary office of forming all the other membranes, and the ſurgeons were adviſed not to ſcrape the ſutures with the rugine, nor trepan near them, leſt he ſhould injure this moſt important connection. The reaſons given for avoiding the ſutures, had no manner of relation to ſurgical practice, and could have no origin but in the capricious ima-

For three days ſhe was bled twice a-day, from one part or other of her, and ſtools were procured in ſuch manner as was poſſible, but to no purpoſe; ſhe ſtill remained perfectly ſenſeleſs. On the fifth day, finding her ſtill in the ſame ſtate, and verily believing that nothing in art could at all ſerve her, I made an opening with a lancet into the longitudinal ſinus, and ſuffered the blood to run off, until her countenance, which was much fluſhed, became pale, and her pulſe, which till now had been full and ſtrong, though labouring, faultered conſiderably; in ſhort, till ſhe ſhewed, as much as a ſenſeleſs perſon could, the marks of a delirium from inanition. I then put a bit of lint on the orifice, and ordered the nurſe to keep her finger lightly on it, until I had viſited the reſt of the houſe. When I returned, the part ſhewed no diſpoſition to bleed again, nor did it ever after. That afternoon ſhe opened her eyes, and moved her arms, and the next morning was ſenſible enough to aſk for drink. She retained her ſenſes for ſeveral days; but a fever coming on, ſhe became delirious and convulſed, and died ſo on the ſeventeenth day from that of her admiſſion into the hoſpital, &c.——Pott, chap. 28. vol. 1.

gination of mere ſpeculators. "Vitandæ ſunt futuræ, (ſays Fabricius *), quia per has dura mater exit ad pericranii generationem." But there is a reaſon, worth taking notice of, why they apprehended ſo much danger from approaching the ſutures, or injuring the pericranium, viz. the ſingular nervous ſymptoms which ſometimes enſue after a mere wound of the ſcalp, without any the ſlighteſt injury to the bone, or to the brain. The nature of this affection I ſhall afterwards explain; at preſent it is natural to remark, how well the doctrines of the old ſurgeons agree with theſe facts. Guy de Chauliac, for example, having conned over the aphoriſms and deſcriptions of Hippocrates and Galen, and enriched his imagination with ſome of the notions of Avicenna and Albacaſis, deſcribes the pericranium thus: "De groſſo panniculo quem Galen vocat pericranium, qui cooperit totum cranium, eſt ſciendum, quod eſt nervoſus, et oritur a dura matre, et ligatur ab ea, ligamentis, nervis, venis intrantibus et exeuntibus per *commiſſuras cranii*," "et conjungantur oſſa cranii cum commiſſuris ſerratilibus, *ut vapores ab ipſo cerebro valeant expirare* †." The opinion was univerſal. Columbus ſays, in his Anatomy ‡, "Provida natum perforatam eſſe, voluit calvariam variiſque futuris diſtinctam ut purgando a recrementis cerebro nuſquam occaſio deeſſet." Numberleſs are the examples he has retailed of good old folks tortured with megrims, for no other cauſe than this purgation of the brain being ſuppreſſed; and he imagines he proves this by finding, in diſſection, their ſutures either obliterated, or very cloſe. "Inde collige (ſays Mangetus) capitis futuras ad valetudinem non parum conferre." In Poland the ſutures are ſaid frequently to have burſt from the ſavageneſs of the plague; and a tale is told in Bonetus ||, of a German colonel, who drank one day of Luttenburgh wine, till the ſutures of his ſcull cracked and burſt; but then he had the advantage, that from this time forward he could drink without ſtint or meaſure, like the Scandinavian Hercules, who drank on, and would have drunk for ever, to win his wager, if he had not obſerved that the other end of his drinking-horn was in the deep ſea §.

The ſurgeon is called upon to remark the peculiar firmneſs with which the dura mater adheres to the ſutures, and counſelled not to apply the trepan exactly upon a ſuture, when the dura mater adheres ſo, but on each ſide of the ſuture, ſo as to be thus

* § 725. † p. 12. ‡ Lib. i. cap. 5. || p. 52.

§ Vide Mallet's Northern Antiquities.—It was Columbus that alarmed the medical world with this apprehenſion of painful and fatal conſequence ariſing from the cloſing of the ſutures. "Patavii ſuperioribus annis juvenem quendam propinquorum voluntate ad me delatum, domi in magno amicorum corona ſecuti qui diuturno capitis dolore vexatus nullis remediis ſanari potuerat, in cujus calvaria vix futurarum veſtigia apparebat, adeo erat compacta in unum, coacta capitis oſſa viderentur.

Sed neque ſemel id mihi contigit experire, complures enim ſecui, qui dum viverent in frequentem capitis dolorem incidere ſolebant, in quorum calvarias, exiguas futuras, et eas coagmentatas, vidimus.

Certiſſimum ergo argumentum nobis erit, capitis futuras non modo conferre ad ſalutem corporis tuendam, vero eo plus conferre quo majores laxioreſque fuerint.

ſure of finding the extravaſation. But I no more find this adheſion capable of limiting extravaſation, than the ſutures capable of ſtopping fractures. I find the extravaſation always extending beyond the place of the ſutures, and covering very generally one entire hemiſphere of the brain. I never ſaw any occaſion for applying the trepan, firſt on the one ſide, then on the other ſide of the future, though much has been written on this ſubject. I find in no book a proof of extravaſation having been limited and interrupted by intervention of a future, nor one caſe unequivocally ſtated, where the ſurgeon, having applied his trepan on one ſide of a future, was obliged to repeat his operation on the other ſide.

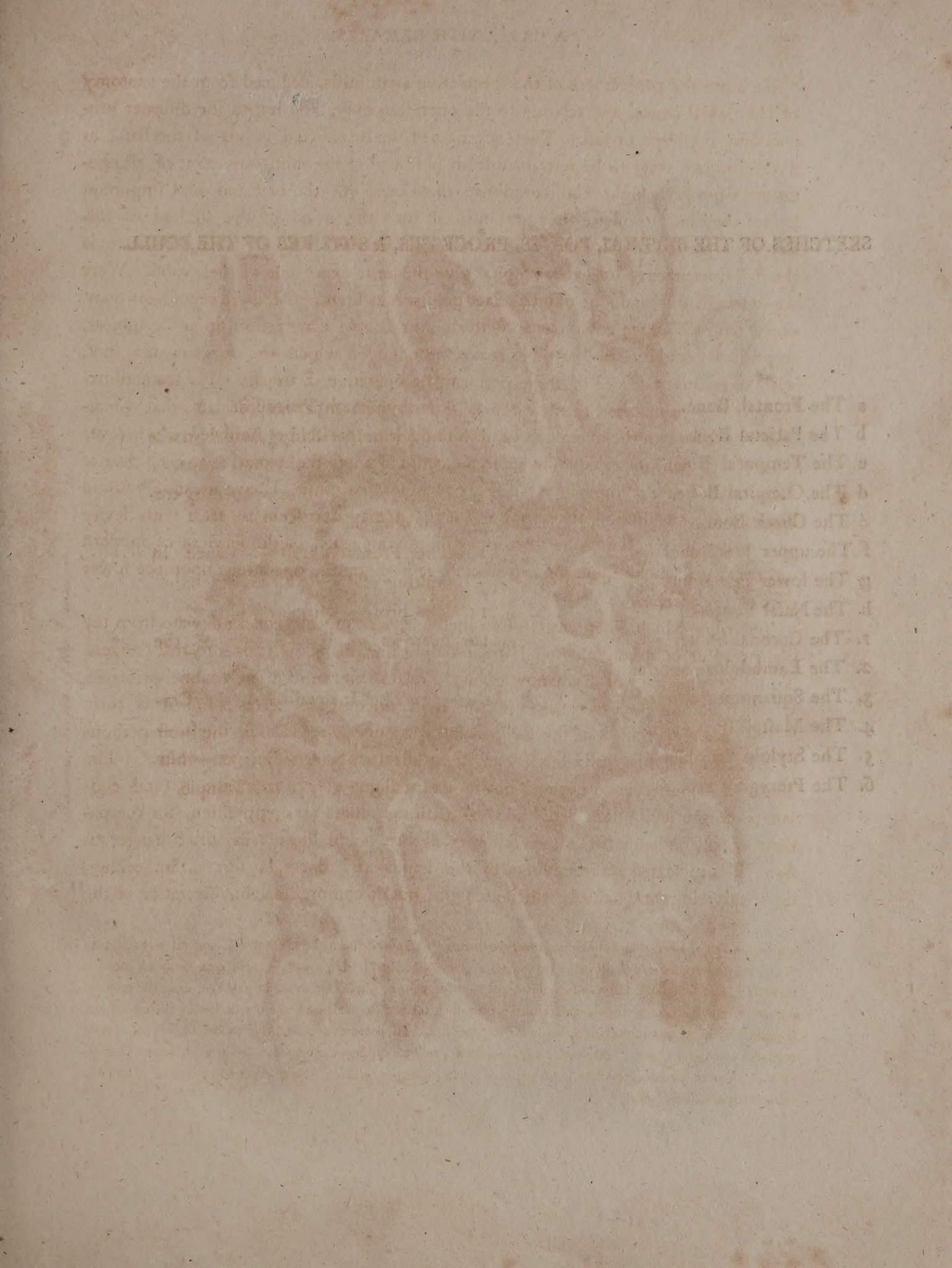
Sixthly, In deſcribing the frontal bone, its internal ſpine or ridge running longitudinally along its inner ſurface, is pointed out as particularly intereſting to the ſurgeon, as being an abſolute bar to the perforating of that part of the bone. The obſervation ſeems important, the difficulty ſeems demonſtrable; but this, though it be a difficulty which muſt naturally preſent itſelf to the imagination of the ſpeculative anatomiſt, is one which can have but a ſlight influence over the reſolution of the practical ſurgeon. He recollects, that in moſt of his operations, even upon the moſt level and equable parts of the cranium, he ſeldom dares to cut both tables of the cranium entirely through, but leaves part of the circle uncut, and begins with his elevator to poiſe out the ſawed piece of bone, before it is entirely inſulated; the part that is uncut uſually breaks and ſplinters with an audible noiſe, and he ſmooths the ragged edges of the trepan circle with the inſtrument named Lenticular. Though a well-inſtructed ſurgeon will not fail to recollect this internal ridge of the os frontis, he will nevertheleſs perforate here when the operation is required at this point, with this ſole precaution, that he will ſaw more circumſpectly, will cut through all that he ſafely can of the circle, burſt up the reſt, and ſmooth the ragged edges of the hole. It is only in one ſingle point, at the very root of the noſe, at a point conſiderably lower than we ever need to perforate, it is only in the very middle betwixt the brows, and in a ſpace no bigger than one crown of the trepan will cover, that this ſpine can at all prove an interruption. I know no miſchance, by which the moſt ignorant perſon could be induced to apply the trepan ſo low, and believe that there is more danger of a thoughtleſs operator doing harm when trepanning upon the ridges of the occipital bone; but in neither the one place nor the other is the trepan required; of an hundred caſes in which this operation is required, the inſtrument is placed in ninety-nine caſes upon the upper parts of the ſcull, upon the parietal or frontal bones *.

* Whether the temporal muſcle ſhould be cut, was long and violently debated, and the *veto* of the phyſicians was very abſolute. Thus Muſitani, p. 162. ſays, "Male ſani chirurgi vulgares acerrime rixantur, An vulnus in temporibus dilatandum ſit? Verum juxta noſtra principia (according to our principles and reaſoning) et ſupra allatas rationes, talem dilatationem reſpuimus, etiamſi oſſis fractura adeſſet, quia incideretur muſculus temporalis,

Such are the conjectures of the ſpeculative anatomiſts, deduced from the anatomy of the naked bones, and relating to the operation only, and not to the diſorder produced by the blow or fall. Theſe are named the interdicted points of the ſcull, as if the ſurgeon were to be reſtrained from performing the moſt important of all operations from ſuch ſlight conſiderations; theſe were yet the beſt and moſt important leſſons they had to offer; they are inſtilled into the mind of the ſtudent to this day with particular diligence, and he never ſuſpects them to be trivial, till he finds the daily occurrences of every hoſpital give the lie to every one of theſe rules. Were we to receive this catalogue of interdicted points in its literal ſenſe, there remains no point of the ſcull which we could trepan with abſolute ſafety; if we reflect upon the ſubject, we muſt be convinced, that there is no one point on which the ſurgeon may not, with an ordinary degree of ſkill, perform the operation of trepan. Far from allowing any degree of merit to theſe remarks, I do moſt impartially declare, that wherever I have known the operator's head teeming with this kind of knowledge, wherever I have obſerved him calculating where he could ſo apply the trepan, as to keep clear of the frontal ſpine, or ſuperciliary ridge, or longitudinal ſinus, I have invariably found him wrong, and ſtubbornly wrong: But that I may not ſeem to treat with levity or ſeverity the wiſe and ſober directions of the ancients, or the ſervility of modern writers, I ſhall make ſome more deliberate remarks on the operations upon the lower part of the forehead.

The rules which I deprecate, often incline the young ſurgeon to deviate from the plain way of common ſenſe, and, by avoiding imaginary, he runs into real dangers. To underſtand the caſe I am now going to relate, you muſt aſſent to one principle, which I ſhall afterwards prove in the moſt unequivocal terms; and it is this: "That mere depreſſion of the ſcull, which was once believed to be the moſt perilous of all accidents, has really but a very ſlight effect in compreſſing the brain." The line of a depreſſed bone deviates but in a very ſlight degree from the natural convexity of the ſcull; the depreſſion, as ſuch, produces no compreſſion, for the patient walks about unaffected, or but very ſlightly; and if he falls into a dangerous ſtate, it is indicated by tremblings of the hands and knees, a ſort of imbecillity, ſlight ſhiverings and nauſea, which are ſigns, not of compreſſion, but ulceration of the

quo ſecto, delirium, caros, et alia peſſima acciderent ſymptomata." And all this he ſays, becauſe Hippocrates had ſaid it; "Quibus tempora ſecantur, convulſio in contraria parte oboritur." Hipp.—"Vulnera quæ fiunt in muſculo temporali, ſunt lethalia." Hipp.—I do not know that ſurgeons or phyſicians were, in any age, even the moſt ignorant, ſo much afraid of any danger reſulting from ſuch inciſion, as fearful of the reproaches of their brethren, ſhould they violate any important aphoriſm of Hippocrates. Hippocrates declares, that an inciſion into the temple produces convulſions, xix. "At vero in capitis ſectione, reliquæ quidem capitis partes ſecuritatem habent dum ſecantur. Verum tempora, et adhuc ſupra tempora venam, quæ per tempora fertur, ſecare non oportet. Convulſio enim corripit ſectum," &c.



SKETCHES OF THE SEVERAL POINTS, PROCESSES, & SUTURES OF THE SCULL.

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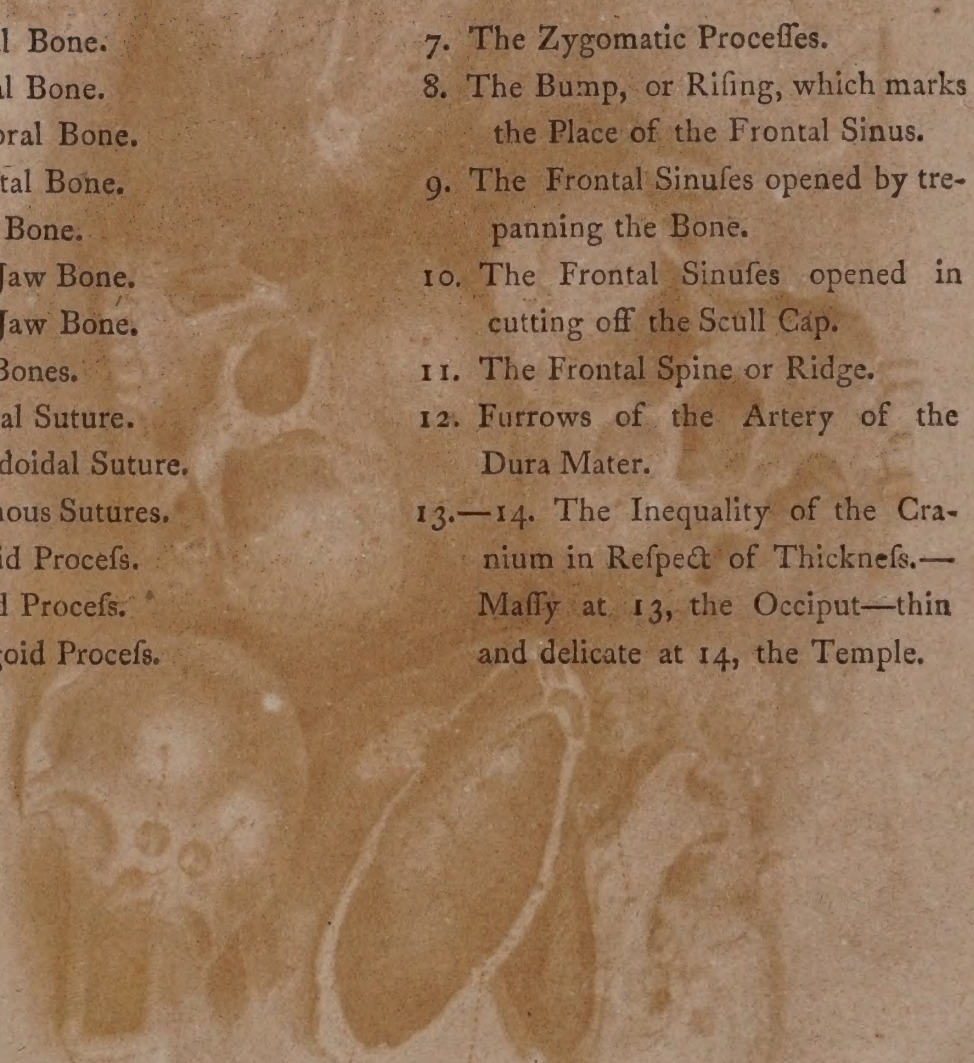

a The Frontal Bone.
b The Parietal Bone.
c The Temporal Bone.
d The Occipital Bone.
e The Cheek Bone.
f The upper Jaw Bone.
g The lower Jaw Bone.
h The Naſal Bones.
1. The Coronal Suture.
2. The Lambdoidal Suture.
3. The Squamous Sutures.
4. The Maſtoid Proceſs.
5. The Styloid Proceſs.
6. The Pterygoid Proceſs.
7. The Zygomatic Proceſſes.
8. The Bump, or Riſing, which marks the Place of the Frontal Sinus.
9. The Frontal Sinuſes opened by trepanning the Bone.
10. The Frontal Sinuſes opened in cutting off the Scull Cap.
11. The Frontal Spine or Ridge.
12. Furrows of the Artery of the Dura Mater.
13.—14. The Inequality of the Cranium in Reſpect of Thickneſs.—Maſſy at 13, the Occiput—thin and delicate at 14, the Temple.

Various Views of the Cranium.

Drawn by J. Bell

Engraved by R. Mitchell Edin.r

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brain, or its membranes. The bone itſelf is ſometimes deadened by the blow, or its ſpiculæ and fractured edges ſtick in the membranes, and occaſion ſuppuration; while the integuments continue entire over a fractured bone, the interſtices often are filled with extravaſated blood and gluten, and ſoon become vaſcular, ſo that the bone reunites, as in the fracture of a limb, and the brain and its membranes remain ſound; but if the integuments be much injured, and the depreſſed and fractured bone expoſed, ulceration is apt to enſue.

"W—— L——, a chimney-ſweep, fell from the third ſtorey of a houſe, upon a ſtreet paved with very courſe round ſtones; though he had ſuſtained a very dreadful fracture of the ſcull, he was very little affected, and not brought into our hoſpital till eight days after the fall. The clerk or ſurgeon, far from expreſſing an alarm either at the nature of the accident, or the peculiarity of the ſymptom, deſcribed the caſe thus in the books: "He has, on the lower part of the frontal bone, a fracture in the form of the letter V, about an inch in length, and with a ſpot of the cranium, which you could cover with the point of your finger, bare, but without any mark of depreſſion." By marks of depreſſion was meant, perhaps, "ſigns of oppreſſed brain;" for, though he had no ſuch ſigns, the depreſſion was great, and was eaſily diſtinguiſhed by the finger or the probe. When I firſt ſaw this man, he was ſitting up in bed, ſubmitting to the operations of the dreſſer, talking rationally, and apparently little injured; and I was told that I might, if I pleaſed, feel a fracture pretty diſtinctly, but without depreſſion, and that the patient was in no danger.

I formed a different concluſion from every circumſtance of his caſe. The height from which he fell was very great; he had fallen perpendicularly upon the forehead, elſe it could not have been fractured, and he had not broken, nor even ſprained, a wriſt or ancle, ſo that there was no intermediate ſhock to break his fall. He was indeed ſitting on the ſide of his bed, but extremely meagre, ſickly, pale, languid, and dejected; his eye was ſunk, his cheek hollow, and his face ſomewhat diſtorted with ſpaſmodic twitches. Upon opening the lips of this triangular wound, which was now ſuppurating, and puffy, I found that the fracture ſeated exactly in the middle of the forehead, was very wide, and that the bone at the lower part of the fracture, and immediately over the eye-brow, was much depreſſed; and, worſe than all, I found the bone ſo completely diſcoloured, that though the depreſſion did not infect the brain, the caries, I was ſure, would, in proceſs of time, affect its membranes, and cauſe ſuppuration. That the fatal ſymptoms were begun, I was convinced, by a more deliberate examination of his nurſe and attending friends; for, though he ſat on his bed,

bore the perpendicular poſture, and ſuffered the operations of the dreſſer; though he anſwered pertinently to all our queſtions; his articulation was ſlow, his motions languid and liſtleſs, his eye oppreſſed, his breathing anxious, and accompanied with ſighing. There was a ſort of ſardonic grin, or diſtortion of face, and a ſillineſs or fatuity of look. His pulſe was quick and irritable, his tongue parched; he had a hectic fluſh upon his cheek. Though he made no complaint, he was ſickly, his hands trembled, he vomited frequently during the night. He was always ſlightly delirious during the night, before he was thoroughly rouſed; and during the day, he walked round his bed, fumbled about the cloaths, ſeemed to wiſh to do ſomething, yet had no purpoſe. In ſhort, he was in a ſtate of indeſcribable diſorder, never ſoundly aſleep, nor entirely awake; and, though his ſickly condition conveyed no intimation of approaching danger to his ignorant friends, it could not but be obſerved by his medical attendants; for theſe are the ſigns, ſlight as they appear, which announce ſuppuration within the cranium, and approaching palſy.

"A conſultation having adviſed that the patient ſhould be trepanned, the operation was performed with ſuch circumſtances of miſconduct, as I think very impreſſive and inſtructive. There was a large tranſverſe fracture acroſs the lower part of the frontal bone, with one limb extending into the orbit. The lower part of the bone above the frontal ſinus was depreſſed the full thickneſs of the bone, and the depreſſed portion of the bone was plainly carious, black, and dead. Unhappily the rules of ſurgery, which the operator but too well remembered, and applied too accurately, were in every thing oppoſite to the dictates of good ſenſe. The rule ſays, "Apply your trepan upon the ſound bone, which can beſt bear it, that you may be able to preſs your levator under the depreſſed bone through the trepan-hole." But common ſenſe directs no man to cut away a ſound and living portion of the cranium, to ſave by elevation a part which is depreſſed, and perhaps dead. The rules of ſurgery ſay, "You ſhall not trepan on or near the frontal ſinus;" while common ſenſe requires the ſurgeon to perforate wherever any cauſe of danger exiſts. The rules of ſurgery would impreſs us with the belief, that "of all the accidents of fracture, depreſſion of the ſcull is the moſt fatal cauſe of compreſſed brain, and the one which moſt immediately requires the operation of trepan;" while this very caſe, combined with a thouſand collateral proofs, ſhows how ſlightly the greateſt depreſſion of the cranium affects the functions of the brain, for fifteen days had elapſed before it was diſtinctly known that the bone was depreſſed, or the man in danger.

Though the depreſſion of the ſcull was, in this caſe, the circumſtance which ſhould chiefly have attracted the attention of a tyro, thinking only about the anatomy of the ſcull, and imagining nothing more correct or abſolute than theſe mechanical rules; the carious or dead part of the bone affecting the dura mater as a foreign body, would alone have appeared important to one who reaſoned on the affections of the brain, and knew them by their ſigns. The one would have thought only of elevating the depreſſed portion of bone, the other of cutting away whatever was dead. The one would have applied the trepan upon the ſound bone, the other would have applied it upon the injured part.

Reſolved to perforate as far as poſſible from this formidable ſinus, the frontal ſinus, the operator, inſtead of elongating the triangular wound of the integuments downwards, prolonged it by inciſions upwards, and applied the crown of his trepan upon the ſound and undepreſſed bone above the fracture. The os frontis was extremely thick, like that of a rachitic perſon; in avoiding the frontal ſinus, he encountered the frontal ſpine, and was, though it may ſeem incredible, fully an hour in accompliſhing the perforation, the patient all the while crying out, ſtruggling, and taunting him with expreſſions which I thought he very well deſerved. But, after having ſacrificed this ſound part of the ſcull in favour of a part carious and irrecoverable, he found the depreſſed portion not only well able to bear the working of the trepan, but ſo exceedingly firm, that no force of levers could enable him to raiſe it. The operator, conſcious that he had by this perforation done nothing effectual for the relief of a patient who had endured ſo much, was now willing, after an intermediate conſultation, to attempt what ſhould have been done at firſt. The inciſion of the integuments was carried downwards through the eye-brow, to the root of the noſe; the whole extent of the depreſſion, and of the deadened portion of the bone, was now diſplayed. The fracture was ſeen running down into the orbit; the operator would have now applied his trepan upon the depreſſed portion which ſhould have been firſt cut away; but, after operations and conſultations laſting an hour and a half, the patient, exhauſted by his cries, reſiſtance, and loſs of blood, the manifeſt inhumanity, too, of continuing ſuch unavailing cruelties, induced the ſurgeon to commit his patient to bed, where his reſt was long and ſound. What he ſuffered afterwards I had not the courage to inquire, but he died.

This would be a long, impertinent, malicious tale, were it not related without names, and for the beſt of purpoſes, to prove to you, that thoſe conjectures, dignified with the name of rules, which you might imagine were the moſt in-

controvertible, and uſeful diſcoveries in the profeſſion, are the moſt to be ſuſpected.

The alarm about wounds of the frontal ſinus has been univerſal; the injunctions not to approach it with the trepan have been tranſcribed from book to book, in the ſame unvarying language. After ſuch prejudices has prevailed for ages, and authority been accumulated upon authority, we cannot become all at once familiar with the idea of trepanning a fracture, or opening an abſceſs in this part as freely as we ſhould in any other. This cavity, which is formed within the inner end of each ſuperciliary ridge, betwixt the two tables of the frontal bone, is the firſt of that great train of cells which occupy all the ſpace betwixt the cranium and the face *. Its place is marked by the bump or prominence on the forehead, from which the root of the noſe ſprings, and is very generally proportioned to the degree of prominence in that part. The frontal ſinuſes of each ſide uſually communicate with one another by ſmall round openings, and always with the noſtrils, unleſs when the communication is interrupted by diſeaſe. Theſe, like all the other cavities, are lined with a delicate and ſenſible membrane, extremely vaſcular, and ſubject to diſeaſe. But that fractures of this part ſhould never heal, that trepanning this part was not merely difficult, (for that muſt be allowed), but full of danger, is a conjecture which could have come into the imagination only of thoſe who were more familiar and more delighted with the amuſing conjectures, than the inſtructive labours of ac-

* The frontal ſinus probably contributes more than any of the other cells to form an important part of the organ of ſmell.

Nothing can be more ludicrous than the following paſſage from Blumenbach, concerning the uſe of theſe cells: "Quod autem creator Op. Max. humano naſo tum inſignibus ſinibus, tamque *mira* et *intricata* fabrica ſtuduerit, hoc vero tanto magis ejus bonitatem declarat quanto certius homini naſus, non, ut cæteris animantibus, tantum neceſſitatis cauſa, ut victum nempe diſcernere poſſint, ſed *magnam partem ad voluptatem quoque et jucunditatem eſt.*" —"God be praiſed (quoth Blumenbach) that it hath pleaſed him, in his infinite mercy, to ſtudy with ſuch fatherly care the ſtructure of the human noſe, for verily he hath given to man a noſe, not like unto that of the lower creatures, merely for ſmelling out his food, but moſt principally hath he conformed that voluptuous member for enjoyment and the pleaſure of man." If this be not a good preface to Slawkenbergius's tale of the promontory of noſes, it is at leaſt no ſlight authority (viz. that of a medical profeſſor) to Triſtram's doctrine of noſes. "Nihil me penitet hujus naſi."

But the beſt illuſtration of the uſe of thoſe ſinuſes is to be found in the comparative anatomy of the lower animals. The bear, the polar bear, of a rough and grunting voice, has innumerable and enormous frontal ſinuſes; its ſmell is wonderfully acute in ſmelling out roots, finding honey, &c. Dogs have great cells, and the larger the noſe, and the more precious the dog, the greater is their extent. The horſe, which is ſo ſubject to diſeaſes of the ſchneiderian membrane, has two large frontal cells, and has a ſmell ſo acute, that being brought even to the ſpot

tual practice *. Monſieur Palfin, a celebrated ſurgeon of Gand, the firſt who had the good ſenſe to think of ſurgical anatomy, or to decorate his book with this attractive title, was yet not ſuperior to the vulgar prejudices in relation to this part. "I think it right (ſays Palfin) to warn the ſurgeon not to apply his trepan upon the frontal ſinus, for the opening will remain fiſtulous, nor to miſtake its lining membrane for the dura mater, nor its mucus for the ſubſtance of the brain †." We cannot wonder to find ſuch errors univerſally received, where Fal-

where mares have lately been, he ſnorts and neighs, as is commemorated in the tale of the election of Darius Hyſtaphis.

* The goat, ſheep, ſhamois, bull, elephant, &c. have the frontal ſinuſes extremely large, and have a nice ſenſe of ſmell for the election of food.

The elephant eſpecially has a ſcull not compoſed like that of other animals, viz. of ſeveral bones joined by ſutures, but apparently of one continued bone, conſiſting of two tables, extremely thin, ſet at the diſtance of half an inch from each other. The tables are each not more than a line in thickneſs, the whole interſtice all over the ſcull is divided by thin partitions into innumerable cells, and with a very vaſcular membrance, communicating with each other by ſmall openings, and the loweſt of theſe cells opens into that great tubular cavity on which the proboſcis is implanted. Each of theſe numerous cells is, in reſpect of uſe and ſtructure, a frontal ſinus, and the reſult is, a ſenſe of ſmell ſo exquiſite, that the elephant can be rivalled by no other animal. For if among a heap of money thrown together by the ſpectators, his keeper touch but one of the pieces ever ſo ſlightly with his finger, the creature will ſeparate and pick up that coin, though mixed with a thouſand pieces of the ſame coin which had been handled by others.

This is, I think, the moſt deciſive proof of all of the peculiar offices of the frontal cells; indeed, the pain we feel in the forehead upon ſmelling volatile ſalts, convinces us feelingly, that they form at leaſt a part of the organ.

* When an author undertakes to treat ſo trivial a ſubject as the anatomy of the frontal ſinus, he is right to make the moſt of it; ſo does Blumenbach, who blows up his bubble to the ſize of a quarto, and is very learned and wonderfully ingenious. He is particularly ſo when he explains the cauſes which occaſion this cavity, which we call the frontal ſinus. Theſe cavities are produced by (what for a ducat?) the action of the frontal muſcles, pulling the outer away from the inner table of the bone; and this he moſt potently believes, becauſe children are given to fretfulneſs and crying, "idque nobis ex eo probabile eſt, quod pauci muſculi faciei in infantibus tenellis toties inacta ſint, quoties ipſa hæc epicranii pars anterior." The opinion of the illuſtrious Haller, who had given away this high office to a moſt inſignificant muſcle, the muſculus naſalis, he holds in great contempt "corrugatori ſuperciliorum cui hanc ſinum efformationem committit illus: Hallerus parum tribuerem, eam preſertim ob cauſam, quod multa ex infra recenſendis animalibus magnis certe frontalibus ſinibus, nullis vero corrugatoribus muſculis, ſunt perdita."——*Blumenbach de Sinibus Frontalibus*, p. 8.

† "Il eſt bon d'avertir en cet endroit les chirurgiens, de ne pas appliquer le trépan ſur les ſinus de l'os du front parce que l'ulcère reſteroit fiſtuleux; et de ne pas prendre la membrane qui les revêt pouce la dure-mere. Il eſt auſſi quelquefois arrivé, au ſujet des playes pénétrantes dans ces cavitez, que la morve etant trop abondante, ou trop épaiſſie, et devenüe griſâtre, et s'echappant par la playe, des chirurgiens ignorans l'ont priſe pour la ſubſtance corticale du cerveau; de ſorte quils ont crû que l'application du trépan etoit néceſſaire. Ce qui montre com-

lopius, at once the greateſt anatomiſt and practical ſurgeon, aſſures us *, that wounds of theſe ſinuſes never heal, and adds his authority as a ſurgeon, "That he never ſaw ſuch a wound cloſe, except once in a child, in whom the cavity filled up with a ſpongy ſort of gramulation." A remark or conjecture rather obtruded upon us as a fact, is at all times diſguſting; and in this Fallopius is moſt unfortunate, ſince in a child, neither the frontal ſinus, nor any other bony cavity is yet formed, becauſe, as Blumenbach might ſay, "the frontal muſcle has not long enough operated upon the bone." But it was the cuſtom of theſe theoriſts to repeat and multiply their conjectures till they themſelves believed them facts. Of this paſſion for conjecturing, what conſequences ſhould follow a wound of the ſinus, there is not a more conſpicuous example than the tale told by Palfin, about the apothecary of Louvain! "In the year 1701, I ſaw an apothecary at Louvain, who having been wounded ſome years before in the left frontal ſinus, was, notwithſtanding the loſs of bone, cured, the wound having healed up all but a ſmall round hole, ſufficient to admit a pea. When this hole was left open, the air eſcaped through it with a force which I felt very diſtinctly on my hand; and ſo much was he oppreſſed when the air eſcaped thus by the hole, that he was obliged to plug it up with a tent, and fix the tent down with a ſtrong adheſive plaſter. His breathing was oppreſſed, no doubt, from the air which ſhould have ſerved for reſpiration eſcaping by this hole, without paſſing round the lungs, which have occaſion for a conſtant circulation of air, to heat, attenuate, and ſubtilize the blood, and render it fit for circulation." That this unfortunate apothecary may have had very hypochondriacal feelings, and been at times overcome with the ſenſation of the air paſſing out though his forehead, "et qu'il ſe deſeſperoit de pouvoir vivre long temps avec cet overture," is indeed very poſſible, but that he was hypochondriacal enough to feel and be anxious, and that Palfin had credulity enough to believe him dying for want of air, chiefly becauſe there was an additional hole for inhaling air by, is all that we can learn from ſuch a caſe. No philoſophy, and far leſs this of Palfin's, about the ſubtilizing of the blood, can account for the ill effects of ſuch a hole; for to the lungs and to the blood it ſignifies nothing, if air is but inhaled, whether it comes through the noſtrils, or through the mouth, through an opening

bien il eſt avantageux au chirurgiens, d'avoir une connoiſſance exacte de la ſtructure et de l'uſage de ces ſinus; mais tous chirurgien un peu verſé dans la pratique, ſçaura bien que ces ſortes de playes de tête ne ſont pas d'ordinaire accompagnées de ſymptômes ſi fâcheux, que celles qui donnent iſſuë a la ſubſtancec orticales du cerveau."—*Palfin Anatomie Chirurgicale.*

* Cap. xii. De Vulneribus Capitis.

in the trachea, through a hole in the fore-head, or, if it were poſſible, through a hole in the back-head. The apothecary was more unfortunate in his knowledge and art, than in his ignorance and credulity; for had he left off thoſe tents which were ſo faſhionable in thoſe days, the opening would have cloſed of its own accord. That there is not one word of truth in all theſe reports, one grain of honeſty in the tales of difficulties overcome "*by practitioners of great diſcernment*," I am well ſatisfied, and have read, with no ſmall ſurpriſe, wonderful caſes of numerous perforations, and pieces as big as the palm of the hand cut out by thoſe who never touched the wound with their little finger.

The following caſe is related by Gooch *.

"Profeſſor Monro ſpeaks of a perſon, who, in an engagement with a privateer, received a wound upon the middle of the os frontis; which, although it was ſoon healed apparently, yet left a continual pain of the part. Some time after his return home, the wound broke open, upon which incident the pain abated, but a deep and extenſive caries was found in the bone by the profeſſor, *to whom he applied, after having been under the care of other ſurgeons to no purpoſe*. The carious bone was not black, but of an aſh-colour, and full of ſmall, like worm-eaten holes, and the diſcharge was large, ichorous, and very fœtid. *This practitioner of great diſcernment*, was apprehenſive that the caries penetrated at leaſt as far as the diploe, *about the breadth of the palm of the hand*, which he eaſily raiſed from thence, except in one ſmall ſpace, where he left it to exfoliate; and cured his patient, after this operation, by the common treatment."

Not one word of which is true, ſo help me God! and Profeſſor Monro, who is a man of ſtrict honour, of ſtrong and manly ſenſe, diligent in obſervation, and whoſe good advice I have often profited by, is, I am perſuaded, incapable of relating the caſe thus, either in converſation or in lecture. My worthy maſter, Mr Wood, performed the operation, and I was at the time his apprentice. This gentleman was Captain of a French ſhip, which he defended very gallantly, and in the engagement, which was very cloſe, he received a piſtol-ſhot in the forehead, betwixt the two ſuperciliary ridges. His ſhip was captured in the mouth of the Clyde, and thirty days after he received the wound he was brought to this city. The ball was ſunk in the hollow of the frontal ſinus, and the integuments almoſt cloſed over it; and though the ball could not be diſtinguiſhed by its colour, you

* Surgical Obſervations, p. 269.

could perceive by the probe that ſome foreign body was lodged there. There was no ſuppuration round the ball, no ſhiverings, languor, oppreſſion, nor other ſymptoms of injury of the brain; he was lively, ſpirited, and reſolute, and ſat himſelf down on a pillow, and laid his head with great compoſure betwixt Mr Wood's knees to have the trepan applied, nearly in the ſame poſture in which a dentiſt places his patient, when preparing to draw a tooth. The ſmall and circular wound, or fiſtula, for it was now callous, was enlarged by an inciſion right down the forehead, and to the root of the noſe. The ball was ſeen nitched in betwixt the fractured edges of the bone. There was little bleeding to retard the operation; a crown of the trepan was applied of ſo large a circle as to include the ball and the wounded part of the cranium. A ball driven through a bone is flattened and ragged, and generally fixed under the fractured edges, ſo that no lever nor forceps can poiſe nor pick it out; and generally, as in this caſe, what you ſee projecting from the wound of the bone is but a fourth part of the actual ſize of the ball. The ball and the ſurrounding plate of bone were cut out, and the poſterior part of the ſinus being ſhivered, the ſplinters were ſeen lying flat upon the dura mater, which was neither wounded nor inflamed; theſe were picked away with a ſilver probe, the wound lightly dreſſed, and the gentleman was cured, without one moment of ill health from this formidable ſinus, though both wounded and trepanned.

Ravaton, army-ſurgeon under the warlike reign of Louis XIV. mentions a ſimilar wound in a foot-ſoldier of the regiment of Condé, who was ſhot at the battle of Dettingen, right betwixt the eyes. The wound ſeemed at firſt (ſays Ravaton) full of danger, for the ſoldier aſſured me that the muſket-ball was lodged; and it is difficult to imagine a muſket-ball lodged in a cavity ſo ſmall as that of the frontal ſinus, without breaking the poſterior table, and touching the brain. I believed the ball lodged actually in the brain, (ſays Mr Ravaton); I ſearched with my probe, but found no outlet from the ſinus. At laſt I diſcovered the ball, encruſted and completely flattened, lodged in the loweſt and wideſt part of the frontal ſinus; and I extracted it without either inciſions or trepanning, and along with it ſeven ſplinters of the bone. The wound was dreſſed ſimply with plucked charpie. The ſuppuration began on the fourth day; it ſoon became very profuſe, which was the prelude to the diſcharge of ſome other fragments of bone, which being looſened, the diſcharge leſſened, the wound healed, and the ſinus was cloſed to a very ſmall opening, from which a watery exudation continued to flow, even to the time of his leaving the hoſpital, which was three

months after the battle: here we have another wound not leſs deſperate probably than that of the apothecary of Louvain, followed too by the operation of trepanning, without any want of breath, or danger of dying.

Never having been accuſtomed to indulge theſe irrational fears, I trepanned this ſinus in a caſe of general convulſion, ſingular in all its circumſtances, and not uninſtructive, but eſpecially in this reſpect, that it was plainly connected with a diſeaſe of the frontal ſinus.

"A very tall, well made, and handſome lad, about twenty-four years of age, a houſe-carpenter in Appleby, while aſſiſting his fellow-workmen in laying a heavy beam upon the frame of a ſaw-pit, ſlipped a foot, and falling forwards, had his head immoveably wedged betwixt the beam which they were lifting and that which had juſt been laid upon the frame; and ſo heavy was this log, that his companions were obliged to take their hand-ſpikes and poiſe it up. He cried out during the time his head was wedged between the logs, and when releaſed was able to riſe; though giddy, he was not inſenſible; nor did the blood burſt from his noſe and ears, as might have been expected after ſuch an injury.

"Though his head ſuffered this preſſure on the ſides, being compreſſed from temple to temple, there is every reaſon to believe that the forehead had ſuffered, and the frontal ſinus been injured; for he walked home under the agony of an acute headach, which ſoon, however, ſubſided into a heavy, dull, and continued pain, aggravated at times, but never entirely abſent. His head was confuſed; he gradually loſt his hearing, and by the third week from the time of the injury was entirely deaf: he returned to work, but his headach, giddineſs, and deafneſs, were unremitting, and he had occaſion to remark, that "he never, from the moment of that bruiſe, had a good head for ſtanding or working in any difficult places."

"The ſudden manner in which he regained his hearing, and the profuſe flow of matter from the ears and noſtrils, which opened the paſſages, are very remarkable. It happened about a fortnight after loſing his hearing, that while he was working in the fields, upon blowing his noſe, there ruſhed out from one ear a great quantity of matter, with a painful noiſe. He fell down by the wall in a ſort of fit, lay for ſome time inſenſible, and when his ſenſes returned, he was as much ſurpriſed at hearing the barking of dogs, and the voices of the people in the neighbouring village, as if he had been born deaf. He now found that matter was flowing from the noſtrils, as well as from the ear, with a ſmell ſo offenſive, that at firſt he

imagined that his hat in his fall muſt have lain in ſome foul place. He ſmelt his hat firſt, and looked to it, but found it not ſoiled, nor foul, and upon blowing his noſe, there run out into his handkerchief a profuſion of foul and very fœtid matter, mixed with blood.

" When he had fully recovered his ſenſes, he found that the diſcharge of blood and matter from the noſe was accompanied with agonizing pains in his head; he retired to the ſhelter of an unfurniſhed houſe, where his companions had been working, and threw himſelf down on a bed-frame, and lay there alone till evening, with his head hanging over the bed-frame, a black, fœtid, and bloody matter diſtilling profuſely from his right noſtril, while an acute and confuſed pain ran through his forehead. He got up after ſome hours, and walked to his father's houſe, about a mile diſtant, in great pain and confuſion of head.

" From this time the pain in his forehead was unremitting and ſevere, and when heated at work, it was particularly violent *. This pain at the root of the forehead was aggravated at times to violent paroxyſms; it affected the eye, puffed up the eye-lid, ſwelled the whole ſide of the face and forehead. The diſcharge from the noſe continued very profuſe, and this local diſeaſe, accompanied with general headachs, afflicted him for five years, and a permanent bony ſwelling, marked by a very conſpicuous protuberance of the right eye-brow at the place of the frontal ſinus, was formed.

" But his complaint underwent a ſad revolution in conſequence of a ſecond fall, which happened thus: After mowing hay in weather which was oppreſſively hot, he retired with the other labourers at mid-day, to reſt in the hay-loft; being overcome with labour, and having fallen into a perturbed ſleep, he by ſucceſſive reſtleſs motions got ſo near the edge of the loft, that he at laſt ſlipt over. One of his fellow-labourers chanced at that moment to obſerve him ſliding, and ran to catch him by the feet, but too late, for he fell from the loft headlong, upon a rugged pavement of big round ſtones, and alighted exactly upon that part of the forehead which had been long the ſeat of diſeaſe; for I find the ſcar of the wound which he then received, juſt over the bulging of the right frontal ſinus. He lay inſenſible during a quarter of an hour, and when he revived, he felt ſick, faint, and languid; and his companions being gathered about him, he waved his hand as for room, and

* He recovered, about a fortnight after this, the hearing of his other ear by a like diſcharge of matter, which alſo happened ſuddenly upon blowing his noſe.

a freer breathing-ſpace. They carried him into the open air, where he inſtantly fell into an epileptic fit, which epilepſy has continued ever ſince.

" The epileptic paroxyſms returned frequently, at leaſt every night and morning, from the time of this fall. He was weakly, almoſt paralytic, walked only with the help of ſtilts, and trailed his limbs along. In about five weeks he had ſo far recovered, as to think himſelf ſtrong enough for work, and the paroxyſms, which had at firſt recurred three or four times a-day, became leſs frequent, ceaſed at laſt, and were abſent entirely for a week. Thus encouraged, he returned to his daily labours, and by the violence of his labours the fits came on again. He had been now ſix months labouring under this diſeaſe, is reduced, weakened, and diſpirited; is diſtorted with theſe fits of ſpaſm or convulſion twice a-day at leaſt, and tormented from hour to hour with ſevere threatenings. Fits ſo peculiar, and proceeding from ſo unuſual a cauſe, I think it right to deſcribe with particular care.

" The convulſion is diſtinctly connected with the diſeaſe of the forehead. The approach of each paroxyſm is announced by pain of the forehead, with a ſenſe of fulneſs; firſt his jaw begins to ſhake with a trembling, and convulſive motion, and the tongue, too, trembles, and is retracted into the mouth. This is the warning or firſt alarm of the approaching paroxyſms, which ſometimes, as he imagines, he prevented by clenching the jaws, and holding them firmly. Being once attacked when reading, he, in hopes of ſtopping the convulſion, thruſt the book into his mouth, the convulſion increaſed, and was as uſual propogated along the neck, arm, and ſide; the book was ſo fixed by the convulſion of the jaw, that he had no power to withdraw it, and the ſuffering was ſo dreadful, that he remembers having howled with agony.

" But the convulſion only begins in the jaws, then trembling and convulſive motions run downwards along the neck; his head is turned to the right ſide, while his neck is tortured with the ſpaſm; the convulſion deſcends from the neck down the arm, and to the hand, which is clenched and contracted, till the whole of the right ſide is affected with it.

" Beſides frequent threatenings, and inceſſant fear, he has three or four regular paroxyſms during the day. He is warned of its approach, like thoſe who have the aura epileptica, by ſlight diſtortions of the parts, and a confuſed ſenſation in the forehead; he immediately clings to a bed-poſt, a cheſt of drawers, a door, or ſome firm body, continues ſenſible, and feels all the horror of its ſlow approach, and all

the pains of the convulſion; and the perpetual fear of this attack has given his countenance an anxious, ſubdued, and melancholy caſt. Firſt in orderly ſucceſſion, comes the pain and fulneſs of the forehead, then the tremblings of the jaw and tongue, then the ſore contractions of the neck, which draws his head over the right ſhoulder, and then ſucceſſive cramps and convulſions of all the right ſide of the body, till it is bent down; and in this ſtate of agony he continues four or five minutes, when the muſcles of the ſide of the arm of the neck gradually and ſucceſſively tremble, and fall into a quieſcent ſtate, and the convulſions of the neck and arm having remitted, the ſpaſm of the jaw, and trembling and retraction of the tongue alſo ceaſe, and then he returns ſlowly to his ſeat. He is always in great confuſion, but never inſenſible, during the fits, unleſs it be during the night; for it would appear, that during ſleep he is ſeized with fits more nearly approaching to the nature of true epilepſy. He paſſes his fæces and urine involuntarily during the night. His diſeaſe has, if not the expreſs form, at leaſt the effects of epilepſy; for his faculties begin to fail, his memory is injured, certain words he is unable to pronounce, and pronounces them with a painful and convulſive heſitation. Although he does not actually fall down, his confuſion during a paroxyſm amounts almoſt to inſenſibility, and each paroxyſm is followed by drowſineſs and a degree of oppreſſion, ſo that very commonly he falls aſleep, his right eye is turned obliquely inwards, the ſwelling of the frontal ſinus over it is very prominent, and gives an obliquity to the whole countenance; the matter which runs from the right noſtril only, is in great profuſion, it is partly glairy, partly purulent, amounts to two or three ounces in the day, and ſometimes entirely fills a bleeding palate *. His ſpeech, eſpecially after a paroxyſm, is ſlow, difficult, heſitating, and interrupted. When pain of the forehead comes, and is not followed by convulſions, he has a general feeling of weakneſs, as if all his joints were looſened; he trembles, and his knees ſhake under him, and he has a trembling and paralytic feeling in the arm.

"This is the whole ſtate and condition of this young man, who, from uncommon health, and bodily ſtrength, is reduced to great weakneſs and deſpondency; and ſince the firſt ſigns of the paroxyſm are diſtinctly referable to the frontal ſinus, and ſince the convulſion affects the ſame ſide of the body with the injured part of the head, are removed all ſuſpicions of its ariſing from any diſorder of the brain. I have reſolved, (encouraged and ſupported by the unanimous voice

* Containing from four to five ounces.

of the conſulting ſurgeons), to trepan the ſinus, hoping, by curing this ulcer, to remove a poſſible cauſe of diſorder: The diſmal ſituation, and earneſt intreaties of the patient, are arguments too powerful to be reſiſted; and the operation, though unuſual, is no raſh enterpriſe, but, on the contrary, entirely void of danger.

"I laid open the diſeaſed and much enlarged ſinus with an inciſion of little more than an inch long, and perforated the bone, which was of ſuch thickneſs, that the aſſiſtants believed that I had miſtaken the caſe, and pierced not the outer plate of the ſinus, but the whole thickneſs of the ſcull; and they plainly ſaid, that the membrane now expoſed was not the lining of the ſinus, but the dura mater. But it was merely the lining of the ſinus; the injections paſſed from this ſmall trepan-hole into the throat and noſtrils, and the patient could at pleaſure draw it back again through the trepan-hole. By a little ſkill and practice, and by inclining the head of the patient properly, the dreſſer ſoon learnt to direct his injection, ſo that the whole of it flowed out by the right noſtril. The lad continued under my care for three months, and I injected the ſore firſt with barley-water, then with ſolutions of vinegar and honey, then with tinctures of bark and myrrh, and finally with tinctures of corroſive ſublimate and crude ſal ammoniac; but (as I muſt confeſs) without the ſlighteſt alteration on the matter, (which ran profuſely from the noſtril), or the ſlighteſt improvement of his health: Deſpairing of doing good, and wiſhing that he ſhould leave the precincts of an hoſpital not always healthy, and enjoy his native air and better food, I ſent him home, having firſt withdrawn the tent, and healed the fiſtula, which cloſed ſolidly in two days, and had always been inclined to cloſe. So untrue are all theſe idle tales about the danger of wounds, and the raſhneſs of trepanning this part.

The diſeaſes of this cavity, from blows, from ſcrophula, from inſects drawn in with the breath, are not unfrequent, and are peculiarly ſo in the lower animals, which, in ſeeking and ſmelling out their food on the ground, draw in the eggs of inſects, who neſtle in the ſinus, and produce extreme diſtreſs. Thoſe which neſtle in the ſinus frontalis of the human body, are uſually worms of the centiped kind, ſometimes red, and cloathed with hair, with black and pointed heads. Worms of this kind are deſcribed in Mr Hill's Caſes, in the Edinburgh Medical Eſſays, in Linnæus, and in many foreign journals. And ſo frequent are they, that often worms are ſuſpected in caſes of ſimple diſeaſe of the bone itſelf, the only affection of the part which I have at preſent even an apology for explaining. The following caſe is ſo purely a diſeaſe of the bone, it has ſo many peculiar features to mark its nature, and bear ſo

cloſe an analogy to that which I have juſt related, that I cannot refrain from giving this brief extract from my private books.

" Mr P——, a man certainly of a ſcrophulous temperament, weakly health, and ſallow countenance, and who has lived a ſedentary life; was, when a boy at ſchool, (though healthy, ſtrong, and active), attacked with a ſpontaneous diſeaſe of the os humeri, which kept him in miſery for ſeveral years, the moſt precious in his life for attaining ſtrong and confirmed health. This diſeaſe was, I ſaid, ſpontaneous, becauſe, though the ſurgeon's anxious inquiries about the cauſe, and his violent exerciſes with his play-mates, induced him to ſay, that perhaps he had hurt his arm in throwing ſtones, yet he never was, at any particular moment, conſcious of a hurt, and the diſeaſe was juſt the common ſcrophulous necroſis, affecting almoſt the whole ſhaft of the os humeri.

" He was a vigorous rambling boy, about twelve years of age, when he was ſtruck rather ſuddenly with this pain in the arm. Under the impreſſion of the part being hurt, a bandage was applied, which the ſurgeon was ſoon obliged to undo, on account of the great ſwelling and increaſing pain. After this pain had continued for ten or twelve days, ſo excruciating that he enjoyed no reſt nor ſleep, a ſmall boil appeared above the middle of the arm, and the fluctuation of matter being ſoon diſtinctly felt, a poultice was applied, the boil burſt, and there iſſued from it a thin and ſanious *ichor;* nor did this ſore ceaſe to diſcharge for five years.

" During the continuance of this ſore, many profeſſional gentlemen were conſulted, by whoſe advice Mr P. paſſed two ſeaſons at Leith, for the benefit of ſea-bathing, and at laſt betook himſelf to Moffat, where the ſurgeons, examining the ſinus with a probe, felt the caries of the bone, and predicted that it would exfoliate, and he ſhould get well. He drank of the mineral well every morning, and bathed once a-week, and in no long time the prognoſtics of his medical friends were fulfilled; for, after the diſcharge of ſome leſſer exfoliations, a carious bone began to protrude through the opening, ſix inches long and three-fourths of an inch in breadth, but was not diſengaged till a year and a half after it firſt appeared, at which period he had attained his 17th year; he diſengaged the bone one morning in pulling and ſhaking it, which had been his daily amuſement, and, immediately after the carious bone was removed, the ulcer cloſed, but with a very ſenſible weakneſs of the arm.

" For ten years Mr P. continued to enjoy uninterrupted health, except that he was, during every ſpring and ſummer, affected with a cutaneous eruption; but in his 26th

year, when attending the Univerſity of Edinburgh, there was an interval during which he was very weakly, languid, and diſpirited. Being adviſed by his friend Dr Anderſon * to retire to the country, he did ſo with great benefit to his general health. This eruption, of a very anomalous character, ſometimes ſuſpected to be an itch, ſometimes ſibbeus, ſometimes regarded as a ſcrophulous diſeaſe, at others as an eruption proceeding from the heat of the ſeaſon, he was entirely cured of, by a ſenſible and intelligent country-ſurgeon, uſing decoctions, probably of the woods.

" After this, he recovered his health and ſtrength, and was in good plight, when ſuddenly one morning he was ſeized with a pain ſo outrageous, as almoſt to drive him diſtracted; the extreme pain in one ſpot, the bump of the frontal ſinus, extending through the whole head: He became deaf, and the hair of his forehead fell off, but the pain ſoon ſettled diſtinctly in the place of the frontal ſinus; and, after about a month or ſix weeks of this diſtreſs, there flowed every morning regularly a quantity of matter from his noſtrils, extremely fætid, ſo that he could not endure it, and attended with ſo much pain, as almoſt bereft him of his ſenſes; he felt as if his forehead would burſt aſunder. At firſt, theſe complaints were preſcribed for by Mr Willſon, apothecary in Glaſgow, who gave him large doſes of phyſic, and certain drops to take, but without relief. He next requeſted Dr Jeffrey's advice, the profeſſor of anatomy, who, probably ſuſpecting that ſome inſect, lodging in the ſinus, might be the cauſe of this diſtreſs, gave him an oil to be dropped into his noſtril three times a-day, and a mercurial powder, of which a little was to be laid upon a hot iron, and the fumes ſnuffed up the noſtrils.

" A year after theſe ineffectual conſultations, and when he had juſt attained his thirtieth year, he again took advice, and was directed to have a ſeton put in the nape of the neck, which both alleviated the pain, and conſiderably leſſened the quantity of matter; but, when the cord gradually cut itſelf out, the matter gradually increaſed in quantity.

" Two years did he endure this miſery, deſpairing of relief, and aſking no advice; but the pain increaſing in September 1800, he conſulted Dr Cleghorn, who ordered him to uſe fumigations, nearly ſimilar to thoſe which Dr Jeffrey preſcribed, and certain purging medicines, which were infuſed every night in boiling water, and

* The biographer, a man of the moſt amiable diſpoſitions, and the warmeſt heart, whoſe talents are too well known to require ſo tranſient a compliment as any thing mentioned in this place muſt be.

taken duly in the morning; and from theſe he found his pains ſenſibly alleviated, though he grew weaker daily.

" About a year and a half after this, his noſtrils were examined, with the hopes of diſcovering ſome cauſe for ſuch intenſe pains, and ſo profuſe a diſcharge; and the report of the gentlemen conſulted was, that two polypi occupied the upper part of the noſtrils, which muſt be extracted. An operation was performed without delay. About two months after this operation, Mr P. obſerved, when walking in the fields, a ſmall quantity of clotted blood mixed with the diſcharge from the noſtrils, and on every exacerbation of pain this appearance was renewed.

" His condition was very hopeleſs, when, in Auguſt 1802, he uſed a courſe of mercury for two months, but forſook it as ſoon as he found it was diſapproved by Dr Jeffrey; it was, he ſays, in the year 1803, in the 37th year of his age, that the ſwelling of the forehead firſt appeared. This was the period in which he firſt conſulted me; but I judged, that the tumor, though it might have attracted his attention but lately, could not be of recent date; it ſeemed to me a diſeaſe, and a long confirmed one, of the frontal ſinus.

" The tumour was moſt conſpicuous, and was a remarkable deformity, riſing exactly at the root or ſetting off of the noſe, occupying the whole ſpace betwixt the eyebrows, ſeparating them, extending two inches and a half up the forehead, and then gradually declining to the general level of the os frontis. A careful examination of the tumour convinced me, that the bone was greatly enlarged, that the walls or bony plates of the ſinus were widely ſeparated from each other, and probably thickened, while a ſofter and puffy tumour of the integuments covered the bony ſwelling. Perfectly perſuaded, from the profuſion of matter which I ſaw flowing from his noſtrils, that this was a great abſceſs of the frontal ſinus, and aware that the evacuation of matter through the natural opening of the ſinus into the noſe muſt be ſlow and difficult, eſpecially if polypi really did obſtruct the upper parts of the noſtril, I foreſaw no danger equal to that of the diſeaſe of the bone, extending through its inner table to the brain, and had no fear but of the matter being obſtructed, and the abſceſs enlarged. Satisfied that the patient ſhould not a moment delay the having this abſceſs opened, by cutting the integuments, and trepanning the ſinus, I ſent him home with this advice. Soon after his return home, from the heat of travelling, or the natural progreſs of the diſeaſe, his forehead ſuppurated ſpontaneouſly, which ſaved his medical attendants from the imaginary dangers of an operation, which, in a caſe ſo decided, could have done nothing but good. His own

report, in a letter to his good friend Dr Anderſon, will beſt explain the ſequel of his caſe.

" A ſhort while after Mr John Bell ſaw me, my brow became painful, red, and tumid. This affection chiefly occupied the ſpace above my noſe, and along the courſe of the right eye-brow. The ſymptoms gradually increaſed for ſeveral days, and the pain became intolerable, occaſioning general diſorder of my whole body. At length the exiſtence of matter became evident, and an inciſion was recommended. The tumor was moſt prominent above the root of the noſe, and a perpendicular inciſion was there made, about three quarters of an inch in length; nearly two ounces of matter were diſcharged, unhealthy neither in ſmell nor appearance; a tent was introduced to preſerve the opening, and it was propoſed to examine the abſceſs afterwards. This was done by Mr Cooper ſurgeon, and by Dr Jeffrey, ſeparately. The cavity was found to extend upwards, and towards the right ſide from the opening. The frontal bone was found denuded to a conſiderable extent, and in one place, immediately under the external opening, a conſiderable portion of the external table had given way, and the probe paſſed eaſily into the frontal ſinus. No air, however, could be blown from the noſe through the external opening, and there was now very little diſcharge from the noſtrils. No looſe bones could be perceived; the inciſion continues to diſcharge a ſmall quantity of matter, of a thick conſiſtence, brown, and ſomewhat fætid. My general health is now, however, reſtored. I go about my uſual occupations, and ſuffer little inconvenience.

" Dr Jeffrey thinks the inciſion ſhould be enlarged, to afford a better opportunity of examining it, and to allow means to be uſed for facilitating the proceſs of exfoliation. Mr Cooper is of opinion, that the operation recommended by Mr Bell has been accompliſhed by the progreſs of the diſeaſe itſelf, no farther interference can be neceſſary; and that no advantage could be obtained from a larger inciſion. Dr Jeffrey, not being in the way of operation, recommended Mr Bell in the higheſt terms as the perſon moſt fit to perform the operation *.

" I hope, dear Sir, you will be ſo good as ſhew this account to Mr Bell, and learn his opinion with regard to the plan I ſhould purſue, and aſk him whether he thinks it right that I ſhould come to Edinburgh, to afford him an opportunity of

* I do not feel that there is any true modeſty in ſuppreſſing the partial ſuffrages of a friend whom I am ſo proud to acknowledge. Perhaps I am not even entitled to ſpeak of this as proceeding from partiality; Dr Jeffrey was probably informed of my having ſome years before trepanned the frontal ſinus in ſimilar circumſtances.

examining it, and remain under his care.—Write me as ſoon as poſſible, and add this obligation to the many favours, &c.——"

I adhere, in this caſe, to the opinion of Mr Cooper; for, though I am perſuaded that all ſuch tumours ſhould be opened early, yet it ſhould ever be with a ſparing hand. I adviſed that this ſore ſhould be lightly dreſſed, and little diſturbed; and, to my great ſatisfaction, I ſaw Mr P. on my return through Glaſgow in the year 1803, in Autumn, with an opening drawing towards a cicatrice; a ſmall black patch covered all that remained. He had recovered his health, his fleſh, and ſpirits; he was happy and eaſy, for the headachs had almoſt ceaſed, little matter flowed from the noſe, and there was the moſt flattering proſpects of a perfect cure *.

I am not conſcious of any improper digreſſion in explaining thus fully the only important part of the anatomy of the ſcull; and I now return to my ſubject, and ſhall ſay a few words in concluſion upon the intereſting and curious art of DISCOVERING FRACTURES; nor is my propoſed criticiſm without its object. The art of diſcovering fractures was cultivated, there is no doubt, by phyſicians and ſcholaſtic anatomiſts, who knew no uſeful applications of their ſcience, who, by all the dignities of their profeſſion, were excluded from operations except as ſpectators, and who ſat mopping and ruminating over the bare anatomy of the ſcull: But they have been adopted by practical ſurgeons, and many a time have I ſeen this ſcraping of the ſcull to diſcover capillary fractures, and witneſſed the exultation with which any fiſſure was diſcovered, which might ſerve as an apology for applying the trepan. Theſe ingenious and trivial obſervations, once adopted into the ſcience, left no room for ſenſible or ſerious thoughts; the mind of the pupil was impreſſed, from the period of his very firſt leſſons, with this belief, that wherever there was found even the ſlighteſt fiſſure, there the trepan ſhould be applied. The operation of trepan ſeemed the greateſt, the moſt important, the moſt neceſſary work of the ſurgeon, and, in performing it, he lay under no reſtraint but that of miſtaking a future for

* I have again ſeen Mr P. at the diſtance of a year from this report. I find the outer table of the ſcull at this part entirely gone, the ſkin and the remains of the outer plate conſolidated with the inner plate, and forming a remarkable hollow. The parts ſeem to be ſolidly united, and there ſeems little danger of a continued caries, or of any ſuch internal ulcer, as might affect the Oethmoid bone, or reach the brain. Except occaſional twitches of ſomething like toothach, Mr P. has no pain. He has no megrims or internal headach. The matter which ſtill continues to flow from the noſtrils, is ſmall in quantity, and is merely mucus. A few weeks ago, he was ſenſible that the matter had become thinner, and changed to that brown colour which forebodes the diſcharge of ſome ſcale of blackened and carious bone; but the diſcharge is again become thick, and is plainly mucus.

a fracture, and feared no danger, but that of performing it ill, of injuring the dura mater, of wounding ſome great veſſel, of perforating the frontal ſinus, or of encountering ſome ridge of bone.

In hiſtories of caſes, no expreſſions are more frequent than theſe, " We ſuſpected a fracture," " we at laſt diſcovered a fracture," " we found a fracture on diſſection, which ſhewed the propriety of applying the trepan." But ſurely no expreſſions can be more dangerous nor miſplaced, nor can any thing be more improper than teaching in elementary books, in books containing the mere rudiments of the profeſſion, and which, being firſt read, make indelible impreſſions upon the pupil's mind, the complete art of diſcovering fractures of the ſcull, as if that were the ſole motive for uſing the trepan.

It is to learning that I aſcribe the ſlow progreſs of real ſcience, and to Hippocrates, the father, as he is named, of phyſic, that I refer thoſe idle obſervations which have all along miſguided ſurgeons. The ſubtile genius of the Greek enabled him to invent and multiply diſtinctions and names, to which, of all his commentators, no one has been able to add any thing new. His book, De Vulneribus Capitis, is not, as you might imagine, a book of prognoſtics, but a book about fractures, and the diſtinction of fractures. He is the author of many of theſe prejudices which now paſs current for ſound practical rules: " Longe majus malum recipit, (ſays Hippocrates), qui in oſſe in ſuturas telum recipit, quam qui non in ſuturas id recipit. Et pleraque horum perforare oportet. Verum ipſas ſuturas perforare nonoportet, ſed ſecedendo in propinquo oſſe perforationem facere, ſi perfores." Thus was eſtabliſhed (and what Hippocrates ſaid was never neglected) the firſt great diſtinction of trepanning fiſſures, and avoiding ſutures; and theſe ſort of diſtinctions and rules, the more they were commented upon, became, of courſe, the more conſpicuouſly abſurd: " The more brittle the bone is, (ſays Muſitani), the more apt to be fiſſured; the ſofter, the more apt to be depreſſed." " Some diſtinguiſh a chink from a fiſſure, and give a fracture the ſame relation to a chink, that a depreſſion has to a fiſſure. But there are beſides four principal diſtinctions of a chink, according to its wideneſs or narrowneſs, its length or ſhortneſs, its ſtraight or curved direction, according as it is ſuperficial or deep *."

* XVI. de Capitis Vulneribus.

* Quanto oſſa duriora ſunt, tanto aptiora ad rimam contrahendam; et quanto molliorem ad contuſionem aptiora ſunt. Sunt, tamen, qui rimam a fiſſura diſtinguent, et ſub rima fracturam, ſub fiſſura ſedem, comprehendunt. Rimarum autem rurſus quatuor præcipue ſunt differentiæ a latitudine vel anguſtia; a longitudine et brevitate; a ſuperficie et profunditate, deſumptæ.—Muſitani, p. 143.

Theſe obſervations of Muſitani are excellent in their kind, fully as wiſe as thoſe of his fellow-commentators. From ſuch diſtinctions, taken from the length, breadth, or depth of fractures, fiſſures, and depreſſions, what could be inferred uſeful to the ſurgeon? So abſurd were the labours of theſe learned men, that even Garengeot was amuſed with their occupations; "it hath pleaſed the ancients (ſays he) to give high-ſounding names to all varieties of fractures, ſo that I will give the moſt experienced ſurgeon, the man who has ſtudied theſe diſtinctions the moſt diligently, fifteen days to learn and repeat their names *. It was in theſe days that ſo much was ſaid about counter-fiſſures, about the brittle texture of the inner table, the tabula vitrea, and of its often giving way, while the external table remained entire."

It was eaſy to perceive the natural inevitable iſſue of ſuch inquiries, and to foretell that this care and concern about the forms and depth of fractures would lead to the frequent uſe of the trepan; this, indeed, was the practice from the earlieſt times, long before the days of Celſus, who ſays, "In omni vero fiſſo fractove oſſe, protinus antiquiores medici ad ferramento veniebant, quibus id exciderent †." In every fracture, fiſſure, rhogme, or almoſt inviſible crevice, it was accounted the duty of the phyſician to have recourſe to inſtruments: This extravagant opinion, received on the authority of Hippocrates, was enforced in the writings of the credulous Van Swieten, and in the commentaries of Paw, the indefatigable Dutch expoſitor ‡. "Trichiſmus, (ſays Hippocrates), the moſt minute and leaſt diſcernible of all fiſſures, is, for that reaſon alone, the moſt frequently mortal ‖." "All ſkilful ſurgeons and phyſicians agree (ſays Van Swieten) in this, that a fiſſure of the ſcull is often attended with much more danger than a violent contuſion, or even fracture of its bones, for a fiſſure is more *difficult* to *diſcover*, and often eſcapes the *ſtricteſt examination*, till it is too late," &c. § Fiſſure or fracture, or ſome inviſible damage

* Il a plû aux anciens de donner des grands noms aux fractures du crâne, noms qui ne ſerve qu' à embaraſſer, noms que les plus experimenté chirurgien, et celui qui les a le mieux appris, ne repetteroit pas au bout de quinze jour."—p. 114. vol. 3.

† Liber viii. cap. iv.

‡ "Nolent itaque chirurgi, majores potentioreſque fiſſuras, anguſtis minus eſſe debere ſuſpectas."—*Paw de Oſſibus*, p. 82.

‖ Eſt autem trichiſmus, arctiſſima rhogme, ſenſuum plerumque fallens, eoque latens; quæ, quia non facile ſe oſtendit, mortis cauſam ſæpe adfert.—Hippoc. de Vuln. Cap.

§ Van Swieten, vol. ii. p. 367.

to the bone, was the ſole danger they feared, the ſole motive or apology for perforating the ſcull: For the raſh imprudent uſe of inſtruments, the ſurgeon was never blamed, but for its omiſſion only; and, if a patient died untrepanned, who was found after death to have but the ſlighteſt fiſſure in any part of the cranium, within or without, it was thought that he had not come fairly by his death. With various ſhaped irons they not only ſcraped the fiſſure, ſo as to widen it, but, when there was ſuſpicion of any thing wrong, they ſcraped till they got through both tables of the ſcull, in ſearch of whatever might offend the dura mater. "Thus, (ſays Fallopius, in his Commentary on Hippocrates), it happened in a young man, a ſtudent, who was wounded on the head with a very heavy ſword, but without the ſmalleſt chink or viſible fiſſure, that it came, God knows how, into my head, that I ought to go down through the firſt table at leaſt to the diploe, (neſcio quomodo factum ſit ut voluerim deſcendere in meditullium); but having by ſcraping got through the outer, and reached the inner table of the ſcull, I there found a wide and very remarkable fiſſure."—Yet it ſounds much like affectation in Fallopius to ſay, that he knew not what motives fortunately induced him to go down to the inner table: the ſurgeons of thoſe days never were guilty in that confeſſion of the Litany, which ſays, "We have left undone thoſe things which we ſhould have done:" they left no poſſible thing undone: it was the univerſal practice to raſp the ſcull wherever the ſlighteſt fiſſure appeared; and it was the particular precept of Fallopius himſelf, expreſſed in theſe words: "Cum ergo magnum ſeſe nobis offert vulnus, abradite uſque ad interiorem laminam *."

So eager were they to diſcover fiſſures, that there is every reaſon to believe that they not unfrequently miſtook the furrows of the arteries for fractures of the ſcull. "I do not preciſely remember (ſays Saviard) at what time it was that I was called into the Faux-bourg Saint Lazare, to viſit a little girl, who, having fallen into a well, had one of the parietal bones laid bare to the breadth of a crown; and the ſurgeon, having obſerved one of thoſe ſlight furrows or impreſſions made by the arteries of the ſcalp, and miſtaking it for a fracture, had declared to the parents that the trepan muſt be forthwith applied. The parents, not daring to refuſe their conſent, had ſent for me to aſſiſt at the operation, and to give the uſe of my inſtruments, which I granted moſt willingly. But the moment I examined the bone, and was conſcious of the miſtake of the ſurgeon, I carried him aſide, perſuaded him that there was no fracture, and that it would be unprincipled to operate, having this conſciouſneſs. However, to exculpate him from the

* Cap. 13.

ſuſpicion of raſhneſs, I ſaid to the parents, that this fracture, being capillary only, we ſhould content ourſelves for the preſent with applying the rugine to aſcertain its depth. I made him, in order to give a colour to this apology, draw the rugine in a harmleſs way along the courſe of the fracture, ſaying in the time to the aſſiſtants, that it did not ſeem to me to penetrate, at leaſt not deep. Thus the ſurgeon was acquitted, and the patient ſaved from a dangerous operation ¶.

Theſe accurate obſervers of the anatomy of the ſcull remarked, that a ſuture was ſmoother than a fiſſure;—that a natural ſuture as wſerrated, while a fiſſure ran always in a ſtraight line;—that a ſuture was covered and cloſed with its perioſteum, while a fiſſure was not ſo, but admitted the blood into the chink ſo as to diſcolour it; and thence they fell upon the admirable invention of pouring ink upon the ſcull, which, by ſinking into the ſlighteſt fiſſure, might diſcover it.

Who has the firſt honour of this invention, is far beyond the reach of enquiry, for it is mentioned by Hippocrates *; but though he is the firſt that directs the uſe of the *nigra medicamenta;* though after-writers, and Celſus eſpecially, have had the ingenuity to ſubſtitute the *atramentum ſcriptorium* †, yet Guillemeau alone had the wiſdom to remark the diſmal conſequences which might ariſe from ſuch a peſtilent infuſion of galls and vitriol upon the brain, and earneſtly inſiſts upon the ſcull being rather daubed with *printers' ink.* But, as Celſus could not foreſee that his books were to be *printed*, he is pardonable for uſing the ink he had; which by the by was not much different from printers' ink. Other inventions followed ſtill more ingenious; they had leaden hammers ‡ for ringing the ſuſpected cranium with, as you would try damaged crokery with the finger. "Pulſu, dignoſcere

* His ita contingentibus, ſi non cognoſcas aut os ruptura ſit, aut contuſum, aut ambo hæc, neque alias videas: ſuper os aliquid maximi nigri coloris, nigro medicamento liquato ſubactum imponere oportet.—*Hippocrates.*

† "At ſi tam quidem rima manifeſta eſt, deinde id ſcalpro detrahendum, nigritiem enim ſi quid fiſſura eſt." —*Celſus*, lib. viii. cap. iv. p. 373.—18.

‡ "Item percutiatur caput cum levi bacculo ſicco, de ſalice aut de pino, et pone auram tuam apud caput; et ſi ſanum eſt, tunc audies ſonum ſanum; ſi fractum aut ſciſſum, audies ſonum mutum."—*Lanfranc.*

¶ Il ne me ſouvient pas bien du temps ou je fus appellé en conſultation au Fauxbourg Saint Lazare, pour une fille qui étoit tombée dans un puits aprés ſonſeau, et à laquelle le bord de ce ſeau avoit découvert un des os parietaux de la grandeur d'un écu blanc. Le Chirurgien qui l'avoit panſée, ayant remarqué ſur l'os découvert une de ces impreſſions legeres ou petites caneures qu'y font d'ordinaire les arterioles qui ſe gliſſent dans leur ſubſtance; et la prenant pour une fracture, avoit prévenu les parens de cette bleſſée de la neceſſité du trépan, pour la mettre à couvert des accidens qui ſurviennent aux fractures du crane.

Les parens ayant conſenti à ce qu'il voulut leur inſinuer, il vint me prier de le venir aſſiſter de mon conſeil

cautus, quid ſolidum crepet *." They gave the patient a cord or wire to hold betwixt his teeth, that when ſtruck it might produce a jarring ſenſation in the fractured part; ſo anxious were they to diſcover a fracture, even when the patient was in his perfect ſenſes, that they ſometimes deſired him to chew a key, or a bit of hard wood. Theſe inventions need no comment; there is one thing, however, which may with propriety be added: "Nonnulli præcipiunt (ſays Fabricius) ægro ut dentibus frangat amygdalam aut nucem avellanem." "Some direct that the patient crack almonds or walnuts with his grinders." If the writers of ſurgical ſyſtems would but condeſcend to add this to their other methods, they would put the whole buſineſs in its true light.

Though I have ſeen many a painful and fruitleſs ſearch for fiſſures, I confeſs I never have ſeen the cranium,—virga percuſſa ut ederet ſonum. And though I have read much about this ringing of the cranium, I never had fallen upon any paſſage in which the author affirmed that he had heard ſuch a ſound, till I read the following in Foreſtus, whoſe learning, titles, and dignity, are a ſufficient apology for what he may ſay upon ſuch an occaſion: "A ſoni conſideratione dignoſcere poſſis, quia rauce ſonat dum ejus caput percutitur cum virga: *imo ego ſæpius animadverti admota aure, vulneratam tanquam ex olla confracta locutum fuiſſe* †."

From the influence of all ſuch ſurgical obſervations: I hope I have delivered you from the theories of an age ill qualified to give leſſons in our art, ſince they knew not how even to amputate a limb with ſafety: From the dreams and fictions of the cloſet, contrived by profeſſors and phyſicians little converſant with our art, and handed down as important precepts to ſurgeons, at a time when ſurgeons were men of no eſtimation. Theſe obſervations formed one entire and conſiſtent ſyſtem, of

pour cette operation, et de luy prêter mon trépan, ce que je fis volontiers: Mais lorſque j'eus examiné la ſurface de l'os, et connu la mépriſe; je le tiray à l'ecart, et luy fis connoître que n'y ayant point de fracture à l'os, ny d'accidens qui demandaſſent l'operation, il n'étoit pas juſte de la faire inutilement: cependant pour le diſculper ſur le jugement qu'il avoit fait avec trop de precipitation, je dis que la fracture n'etant que capillaire, et les accidens n'etant point trop preſſans, nous nous contenterions pour ce jour-là de ruginer l'os ſur la fracture pour mieux juger de ſa profondeur.

Je luy fis donc donner ſur l'os quelques coups de rugine fort legerement et ſeulement pour la forme, puis ayant dit aux aſſiſtans qu'il ne me paroiſſoit pas que cette fente penetrat beaucoup, le chirurgien ſe trouva diſculpé; et la bleſſée quitte d'une operation qui luy auroit fait plus de mal que de bien, ſoit en frappant doucemeut ſon imagination ſur la grandeur de ſa bleſſure, ſoit en retardant conſiderablement la gueriſon de ſa playe, qui ne tarda gueres à guerir apres une legere exfoliation de l'os.

Il paroit par l'expoſition de ce fait, que les chirurgiens peuvent quelquefois faire des operations inutiles, qu'ils croient tres-neceſſaires, faute d'avoir les lumieres que leur pourroit l'anatomie, pour bien juger de l'etat des parties du corps, tant naturel que contre nature.

* Perſius. † Foreſti Obſ. Chirurg. p. 97.

which a fondneſs for operation was the natural conſequence, and it is my profeſſed wiſh, and my duty, to impreſs this truth upon your minds, "That all the knowledge of ancient and of modern ſpeculators derived from the anatomy of the ſcull, cannot furniſh forth one uſeful rule, ſince it relates merely to fractures of the cranium, not to injuries of the brain." In plucking up, perhaps, too carefully this rank overgrowth, I hope and believe that I have ſown the ſeeds of uſeful knowledge, and will truſt to your forbearance and partiality not to be fatigued with the length of the narrative.

"Diſce——cum veteres avias, tibi, de pulmone revello."

At our next meeting, I ſhall be employed in delivering doctrines of a very different complexion; not in repeating theſe idle diſtinctions of fractures, fiſſures, depreſſions, and depreſſed fractures, but in deſcribing the bones of the cranium, as part of a living ſyſtem, endowed with circulation and ſenſibility, and liable to every kind of diſeaſe that affects the ſoft parts:—In explaining to you the various injuries of the bone, of which fracture is the leaſt important:—In proving to you how much the cranium depends for nouriſhment on its inveſting membranes, the perioſteum, and dura mater;—how the ſeparation of theſe by a blow, or how the ſhock which the bone itſelf receives, may occaſion its death, whence ariſe ſuppurations of the dura mater, and ulceration of the brain. It is not the apparent and obvious danger, the fracture or fiſſure of the ſcull, that we have moſt to dread, (though the fracture is no doubt a mark of violence, and therefore of danger), but that imperceptible injury which is to be evinced only by future and remote conſequences.

The opinions and precepts which I have held up to your contempt, are thoſe of a country, which excelled in the fine arts; but the man who excelled all others in natural ſcience, or rather in the means of attaining truth, has taught me not to ſhrink from this duty; and, in his vigorous and maſculine words, ſhall I make my apology, for whatever may ſeem too boldly done: "Nam ſi quis in omnem illam librorum varietatem, qua artes et ſcientiæ exſultant, diligentius introſpiciat, ubique inveniet ejuſdem rei repetitiones infinitas, tractandi modis diverſas, inventione præoccupatas; ut omnia primo intuitu numeroſa, facto examine pauca reperiantur. Et de utilitate dicendum eſt; ſapientiam iſtam quam à Græcis potiſſimum hauſimus, pueritiam quandam ſcientiæ videri, atque habere quod proprium eſt puerorum; ut ad garriendum prompta, ad generandum invalida et immatura ſit."

DISCOURSE II.

OF THE PATHOLOGY OF THE INTEGUMENTS, SCULL, AND DURA MATER.

I BELIEVE I have proved to you, in my laſt diſcourſe, that the ſtudy of the ſutures, the diploe, the holes and proceſſes, the thickneſs and thinneſs of the ſcull, begat a dangerous ſpirit of enterpriſe, taught the young ſurgeons to think f operations, of nothing but operations, and led naturally to a harſh and unrelenting practice; and you are now aware of this important truth, that the rules of our art are no more to be deduced from the external forms of the ſcull, than the philoſophy of the human intellect from the ſhape of the convolutions, cavities, and proceſſes of the brain.

That fractures of the ſcull, the moſt alarming and ugly fractures, are attended with leſs danger than the ſlighteſt accidents, (which lead to ſuppuration of the brain), I ſhall prove to you at another time; and I ſhall begin now to unfold the true theory of theſe injuries of the brain, by explaining, not the outward form of the ſcull, and the anatomy of its ſeveral bones, but the internal organization, the living powers, the ſuſceptibility of injury, and the ſympathy one with another of the pericranium, the ſcull, and dura mater:—theſe are the integuments of the brain, and from the ſlighteſt injury of the moſt remote of theſe, there often enſues, ſlowly, imperceptibly, and at a diſtant and unſuſpected period, ſuppuration of the brain itſelf. Life is endangered more frequent-

ly by a laceration of the integuments, or by mere contuſion of the ſcull, or by an imperceptible ſeparation of the dura mater, than by the wideſt fractures. Now, the proofs of this conſiſt in facts, which even in their ſimple detail, though not connected by theory, nor recommended by any ingenious explanation, would be of themſelves uſeful: but the mutual dependence of the ſcalp, the ſcull, and the dura mater, is ſo clearly made out by innumerable practical examples; the progreſs of diſeaſe, from a ſlight puffy tumor of the ſcalp, to a fatal ſuppuration of the dura mater, is ſo plainly traced; the ſlow but undeviating progreſs of fatal ſigns, from the firſt nauſea, and ſlight tremblings of the hands and tongue, to the fatal convulſions, is ſo eaſily traced, and forms ſo intereſting a ſubject for judicious prognoſtics, and ſenſible and manly practice, that I know not in the circle of our profeſſion a piece of pathology more intelligible, nor a ſubject of inquiry more eaſily proſecuted, to ſure and intereſting concluſions. And we have this encouragement to conſider the pathology in place of the anatomy of the ſcull, as the rule of our prognoſtics, that while anatomy, and the enumeration and claſſification of fractures, has led to an undue propenſity to operation, the ſtudy of the living powers, and mutual dependence of theſe parts, leads to a reſerved, modeſt, and rational practice,—to a juſt confidence in the powers of nature,—to a careful and ſolicitous attention to all the inſidious ſymptoms of ſuppurating brain.

We have much reaſon to guard againſt deceptions ſo natural, ſo pardonable, as thoſe which enter into the vulgar belief concerning the nature of bone. Bone is defined according to its obvious and uſeful properties; and theſe are, its ſtrength, its hardneſs, and firmneſs, its capability of ſupporting the ſofter parts, to which it ſeems altogether diſſimilar. A bone is laid upon the anatomiſt's table, dry and bare, and deprived of all its natural connections, and he diſcourſes only on its inanimate properties of ſtrength and firmneſs; or on its holes and proceſſes, and external forms; or on its relation to the ſofter parts, as affording them ſupport, or proliction; but never on its having one common nature with them. He even miſtakes the moſt obvious circumſtances of the ſtructure of bone; ſeeing a cellular ſubſtance, full of blood-veſſels, pouring out blood profuſely, when wounded in the living body, and deſtined, moſt obviouſly, like the cellular ſubſtance of ſoft parts, for the growth and perpetual nouriſhment of the bone, he deſcribes it as a cavity full of cancelli, which are occupied merely with fat or oil, to lubricate the bone, and prevent its becoming fragile.

Bone is by nature ſo different from the other parts of the body, ſo perfectly firm, ſo colourleſs, and apparently inſulated, that we forget to think of it as conſtituted

like the other parts, as living by the ſame circulating blood, or as ſubject to the ſame diſeaſes. Bone, though extremely vaſcular, has yet ſo little appearance of blood, that its circulation and living powers are demonſtrable only by the moſt ſubtle injections, or to be inferred from particular facts. Bone lives by a ſyſtem of veſſels ſo peculiar to that form of animal matter, that when broken, lacerated, or any way thrown into unuſual action, thoſe veſſels ſecrete only bone, which, in the caſe of wounds, or fractures, re-unites the broken parts; in caſe of necroſis, (*i. e.* mortification), regenerates the bone; in caſe of diſeaſe, produces tumor; and all this ſeems ſo diſtinct from the ſecretions performed by veſſels in all other parts of the body, and is a proceſs ſo little dependent on ſurrounding fleſh and membranes, that the vulgar muſt inevitably judge of bone as no other within the body, than that dead ſubſtance which they ſee and handle out of the body; in ſhort, as a firm and peculiar concrete, deſtined to ſupport the ſoft parts. The learned partake of this prejudice. The living powers and properties of this part of the ſyſtem are not always preſent to our imagination, and it is only when called upon, (as frequeutly we are by accidents and the various conſequences reſulting from its diſeaſe), to recollect its organization, that we reaſon according to the analogy of the ſofter parts.

The ſcull is a living bone, defending the moſt important organ of the body, whoſe ſlighteſt injury, through the medium of its inveſtigating membrane, draws after it the moſt diſmal conſequences. When the ſcalp is bruiſed,—when the dura mater is violently ſeparated by a ſhock,—when the ſcull itſelf is deadened by a heavy blow, ſo as to loſe its circulation, and be no longer able to ſupport its connection with the ſurrounding parts,—a puffy tumor ariſes externally, while the brain is undergoing a ſlow ulceration within. The outward marks of injury ſeem trivial, the ſigns of internal danger are ſlight; yet there is no danger ariſing from injuries of the head ſo inſidious, no cauſe of death ſo inevitable, as that which follows ſuch a blow. Although the ſympathy of theſe ſeveral teguments of the brain, of which we are prepared to regard the ſcull as by no means the moſt important, ſeems merely a ſubject of ſpeculation hypothetical in its nature; yet does the inquiry lead to the ſureſt prognoſtics, and to the moſt incontrovertible rules of practice; becauſe the proofs of this ſympathy are founded on the obſervation of cauſes, ſlow in their operation, obvious to every ſenſe, terrible in their conſequences, and aſcertained by frequent diſſections of thoſe who die.

Till of late years, anatomiſts were utterly ignorant of the nature of bone. "A young Ruſſian nobleman, of the name of Buterline, was, in a ſkirmiſh with the Tartars, wounded ſo cruelly, that a portion of the ſcalp, ſcull, and all was car-

ried clean away by the ſtroke of a ſabre. The ſurgeon having killed a dog, cut out a portion of its ſcull, correſponding with that which in this nobleman had been cut off with the ſabre, nitched it into the wound, and atchieved a perfect cure. The nobleman exulting in this miraculous operation, told it to his friends, and his friends told it to the prieſts, and the prieſts told it to the Archbiſhop of Moſcow, and the Archbiſhop of Moſcow put him under the ban of the church, from which he was driven forth for having this fragment of a beſtial body united with his, and baniſhed from the aſſemblies of the faithful all over the Ruſſian empire, ſo long as the ſaid piece of dog's ſcull remained united, and joined into the head of a Chriſtian man!

"But this nobleman, longing to be received again into the boſom of the church, and willing to endure any pain rather than not be honeſtly and truly cured, ſpoke to the ſurgeon, deſiring that he ſhould take away this piece of dog's ſcull; which being done, and his cure accompliſhed after another method, he was relieved from the ſentence of excommunication *."

Not the jealous and drunken prieſts of Ruſſia only, but the learned phyſicians of all countries, believed that a piece of dead bone might thus be united with the living ſcull, or rather with any other piece of bone which they knew not, nor even ſuſpected to be alive.

Every ſurgeon was in old times in the practice of requiring a piece of gold, which he hammered and beat out into a form and ſize ſuiting the openings made by fracture, or the hole made by his trepan:—how far this may have been deſigned to deceive the vulgar, or perſuade the friends; how ſoon this elymoſinary piece of gold was transferred to the pocket of the dextrous operator †, we need not ſeek to know,

* Tartarus quidam caput hujus graviter adeo enſe vulneraverat, ut, præter integumenta, cutem nempe piloſam, aliaque oſſis cranii etiam particula quædam ablata, adeo ut caput inſpicienti denudatum non ſolum, ſed et vulneratum, occurreret cranium. Chirurgus locum apertum quo repleret, occiſi canis ex cranio particulam deſumpſit, figura et magnitudine ei quæ enſe ex capite nobilis ablata reſpondentem, eamque loco læſo adaptavit; et hac methodo integre ſanitati redditus nobilis. Hic miraculoſe reſtitutus, rem geſtam, gaudio exultans, amicorum notorumve variis, enarravit, qui eandem theologis, et per hos metropolitano communicarunt, ſicque efficerunt, quod, excommunicatione inſtituta, ad loca ea quibus conveniebant Chriſtiani, per totam Ruſſiam, acceſſus nobili dicto denegatus fuerit, uſque dum oſſis capitis canini particula indicata unita maneret oſſibus capitis Chriſtiani hominis. Nobilis eccleſiæ membris annumerari mallens, quam, ad veram curationem, quævis non perferre, chirurgum oſſis canini fragmentum auferre juſſit, ſicque curatione alia adhibita, excommunicationis vim effugit.

† "There are ſurgeons, no doubt, (ſays Paræus), or rather pretenders to ſurgery, who in ſuch caſes receive a piece of money, (which of courſe muſt be gold, as it is to be within the body), and in the preſence of the pa-

ſince this is fairly implied, that among all ranks of men it was a received opinion, that a piece of bone, or a piece of gold, might be ingrafted upon the ſcull.

The moſt elaborate doctrines among the older writers concerning the office and uſes of the dura mater, do not bear the ſtamp of any more refined philoſophy; they did not know the bone to be alive, far leſs did they imagine that the dura mater was deſtined to nouriſh the ſcull; they even did not know that it was connected with its internal ſurface; they believed that there was naturally an interſtice betwixt the mediaſtinum and ſternum, and that a like interſtice was interpoſed betwixt the dura mater and ſcull: The dura mater, they imagined, belonged ſolely to the brain; they believed that the dura mater acted upon the brain like a glyſonian capſule; that the contraction of the dura mater promoted the circulation within the brain, as was manifeſted in the alternate riſing and falling of that membrane, when the brain was expoſed by wounds or trepan. They imagined this ſpace to be occupied by air only, and even made the bubbling out of that air through the chinks a proof of fracture: "For if the patient," ſays Fabricius, "cloſe firmly both noſe and mouth, and preſs the air upwards, he will diſcover the air to bubble out through the fiſſure, for the inflation of the dura mater forces out the air or humour, which is incloſed in the ſpace betwixt the ſcull and dura mater *."

Each of theſe pathologiſts believed moſt potently all the uſes that any other aſſigned for this cavity, and all the ſingularities which were deſcribed. Hildanus, on account of the free perſpiration through the ſutures, and other good conſequences of this open ſpace, approves entirely of what nature has done: "Spatium vero inter

tient beat it out to the form and ſize of the wound, and put it in there to defend the brain, and to be in place of bone, but they never fail next day to remove into their purſe." Vide Les Oeuvres de Parce, p. 241-2.—Though in thoſe times ſuch miſerable practices may have been reſorted to by theſe pretenders, to whom the cure of broken heads was uſually committed, yet I have no doubt that this inſertion of a plate of gold or ſilver was practiſed in good faith by men of ſkill; and though I have no conception of any kind of union betwixt ſuch a plate of metal and the ſubjacent parts, I have no doubt that the inciſion might heal over ſuch a foreign body, and the plate of ſilver lie harmleſsly betwixt the ſcull and the ſcalp, as a ball lodges for years among the muſcular parts, or is nitched into a bone, without producing caries, inflammation, or pain. In the Ephemerides German. anno 3. No. 278. is a caſe by Raygerius, of a ſoldier wounded in the head, who loſt a part of one parietal bone, as broad as the palm of the hand. This loſs was replaced with a thin and perforated plate of ſilver. The granulations ſhot through the holes in the ſilver plate, and encountering thoſe from the ſcalp united with them, incloſed the plate ſolidly in the cicatrix, ſo that, as Raygerius reports, it could be diſtinctly felt by preſſing it with the finger.

* Primum enim ſi æger clauſo ore et naribus ſpiritum omni conatu detineat, et ad ſuperiora impellat, ſi tunc per rimam exeat halitus, &c.' Dura mater enim inflatur, ut aer ſeu humor qui eſt in ſpatio inter duram matrem et cranium per rimam extrudat.—*Fab. de Vulner.* cap. 7. p. 858.

ſuturas recte natura liberum reliquit," &c. * Thus it happens that miſrepreſentation riſes on miſrepreſentation by natural degrees, till the abſurdity gets to a towering height; though Fabricius believed merely that the riſing of the dura mater drove the air naturally contained in this ſpace before it, Ruinhuiſen ſays a great deal more. He ſays, "We may conveniently enough diſcharge the matter from the dura mater, when the patient comes to cloſe his noſe and mouth, and ſo drives the included wind from the *breaſt to the head* †." "I do not well ſee (ſays Morgagni) how we can deny that the brain may ſometimes be more or leſs diſtant from the ſcull even in the living body." "That the brains of children lie very high, even at the full moon, was the decided opinion of Turner; wherefore he ſays, "the operation of trepan is to be in them performed with every precaution." All ancient authors aſcribe much influence to the moon in diſorders of the head, and Fallopius, in an eſpecial manner, believes that the brain is compreſſed: "That this ſpace is augmented betwixt the ſcull and the brain, when the moon ſhines throughout the whole night." Theſe neap-tides of the human intellect were carefully obſerved by all learned phyſicians; and ſurgeons were taught, according to the precept of Hudibras, how much ſafer and more officious it was to perform,

"The free trepanning of the ſcull,
As often as the moon's at full.

The influence of opinions, ſo remarkably ingenious and learned as theſe, is never ſlight; all the theories of injuries of the brain were more or leſs related to this ſuppoſed cavity: "It was by being depoſited in the empty ſpace that occurs betwixt the ſcull and dura mater, that extravaſated blood was ſuppoſed to inflame, corrupt, and be finally converted into pus ‡." It was not difficult to account for the generation of matter, when blood was firſt extravaſated, for the blood was corrupted by ſtagnation and heat, and by the new depoſition of unconcocted ſerum. "You will naturally inquire, (ſays Morgagni), why the blood, which was extravaſated within the ſcull, gave no immediate tokens of its effuſion, inſtead of beginning to do ſo many days after; without doubt, it is becauſe very ſmall drops, diſtilling very ſlowly from very ſmall veſſels, could not arrive till after ſome days to ſuch a quantity as to be injurious to the

* P. 18. † P. 148.

‡ In vacuo illo ſpatio quod inter cranium ac duram cerebri meningem intercedit, inflammatur aliquando ſanguis, ſuppuratuſque in abſceſſum convertitur. *Arnold.*

brain." Even the favourite doctrine of inſenſible perſpiration ſuppreſſed by cold, was called in to account for the corruption of the dura mater. "This injury, by giving occaſion, (from the conſtriction of the external veſſels), for a greater quantity of blood being carried through the internal parts, and that in a leſs ſalubrious condition, by reaſon of the inſenſible perſpiration being detained! corrupts the dura mater*." Such is the elaborate pathology of Morgagni.

It was ſtill eaſier to account for the matter found under a fracture; they had this ſimple conception of ſuch purulent effuſion, viz. that it penetrated through the chinks of the fracture, and dropped inwards upon the brain†. When, upon perforating with the trepan, matter iſſued through the opening, they never doubted that it was the ſame which had dropped inwards through the fracture, and they eſtimated the danger according to the quantity of matter which might thus fell inwards upon the brain, or, in other words, according to the wideneſs of the fracture or fiſſure. "If only the outward table (ſays Muſitani) be fractured, there is no manner of danger; but ſhould both tables be fractured, there is the utmoſt danger, ſince the ſerum may there fall inwards upon the dura mater ‡." We cannot wonder, then, at the care with which they ſcraped every fiſſure, to ſee whether it penetrated, and trepanned every ſlight fracture, leſt the ſanies of the outward wound ſhould fall upon the brain.

When there was no extravaſated blood to corrupt, nor no open fracture to inundate the dura mater with matter, they bethought themſelves, that all the body was tranſpirable, and why not the ſcull? "How to account (ſays Valleriola) for the ſanies penetrating even into the brain, when there is neither fiſſure nor fracture of the ſcull, ſeems very hard; yet we ſhall ceaſe to wonder how this happens, if we but reflect that the whole body is perſpirable ‖." Sometimes "noxious matters were ſuppoſed to perſpire from within through the cranial pores, to the infinite comfort of the cerebrum. §" The pus engendered within

* Morgagni, p. 89.

† Perforavi (ſays Verdue) atque evacuata materia quæ per rimam ſub cranium paulatim deſcendit, ſymptomata ceſſarunt, &c. p. 212.

‡ "Si externa ſaltem lamina findatur rima, periculo vacat; periculoſum vero eſt, ubi utraque lamina fiſſa eſt, cum ſanies tum in duram matrem decidere poſſit." *Muſitani*, p. 155.

‖ Natura aliquando pus noxiamque materiam ſub cranio latitantem per iras inopinates extrudere conſuevit. *Skenkius*.

§ "Sed quomodo ad meningas ſanies uſque penetraverit quum eſſet in oſſe fractura aut rima magis mirum videri poteſt. Sed tamen mirari deſinemur, ſi intelleximus conſpirabile eſſe univerſum corpus." *Valleriola*, p. 159. Folio.

the cranium, and which endangered the brain, was, in a particular manner, ſuppoſed to tranſpire through thoſe inviſible pores *; and ſuch was their perſuaſion of the importance of this tranſpiration of foul and fuliginous matters through the pores of the ſcalp, and the pores of the ſcull, that they believed a man could not a moment enjoy his intellect, nor live in health, without ſuch a diſcharge. "For all kinds of fumes aſcend by nature to the head, wherefore the head is porous, and thoſe vapours get vent, which, were they to be obſtructed, muſt injure the brain, and all the ſenſes therewith; it is by the open pores that the vapours eſcape †:" So ſays Vitalis de Furnes, the moſt learned of the eccleſiaſtics who have enriched our profeſſion with their theories. Nor did they diſdain every care of the external integuments of the head to keep the brain in good order, pure, and free from ſuch fuliginous vapours. "To preſerve a wholeſome ſtate of the body, (ſays Vitalis), a livelineſs of the ſenſes, and a vigorous condition of the brain, combing is of no ſlight importance, ſince, by combing the hair, the pores are opened, the noxious fumes exhaled, &c." quia pectinando pori aperiantur *. In modern times, this ſame pectinatio, this laudable attention to the exterior of the cranium, will perhaps be regarded not as a cauſe for this nimble and lively condition of the brain, but as an approved ſubſtitute. A blow upon the head, according to the apprehenſion of the older phyſiologiſts, neither killed the bone, nor injured the dura mater, but conſtipated the pores of the ſcull; "this is a full and perfect account of the whole affair, (ſays Magatus), both according to experience, and according to reaſon; according to reaſon, becauſe the bone being bruiſed, its pores are conſtricted, perſpiration ſuffocated, the natural heat extinguiſhed, and, of courſe, ill humours generated from ill-concocted matter, which, riſing in form of vapour, and, finding no exit, inflames and corrupts the contuſed bone, even from the contuſed ſurface down to the dura mater, which, being hetreunto connected by various ligaments, thoſe ligaments lead the corruption onwards from the bone to the dura mater, which is diſordered and inflamed by the foul mat-

* Accidit etiam quandoque in vulneribus capitis, quod ſanies non habeat liberum exitum a vulnere, ſicque perporoſitates oſſis reſudet ab intra cranium.

† Et quoniam omnes fumoſitates ad caput aſcendunt, ideo caput eſt poroſum ut vapores exeant, qui, ſi manerent, cerebrum læderent, et, per conſequens, omnes ſenſus; cælerum apertis poris illæ fumoſitates exeunt. Dom. de Vitalis de Furnes.

† Ideo ad corporis ſanitatem, bonumque ſtatum cerebri, et vivacitatem ſenſuum, valet pectinatio, quia pectinando pori aperiantur, fumi exhalantur. De Vitalis de Furnes, p. 72.

ter collected upon it, offenſive both from its natural qualities, and the peſtilent exhalations *."

What, then, is the ſum of this philoſophy, which has occupied the minds of men celebrated in paſt ages for talents and knowledge, and regulated their practice? What will learning do for us in this department of ſurgery? It will teach us, that the ſcull is a mere bone, ſuch as we ſee it on the ſtudent's table, compoſed of diſtinct pieces joined by ſutures, having cancelli filled with fat, to prevent its brittleneſs, and perforated on both its tables with pores, calculated to allow of every needful tranſudation; that dead bone may be united with the ſcull, or its injuries and loſs of ſubſtance replaced by other foreign matter; that there is betwixt the ſcull and dura mater a ſpace full of air, ſeparating the inner ſurface of the ſcull from the membrane which immediately covers the brain; that the cranium has a free perſpiration through its ſutures, and through every pore; that the ſerum or purulence which injures the brain is either generated from extravaſated blood, or diſtils through the ſutures, or tranſudes through the pores of the ſcull, or is a fermentation of ill-concocted matter, proceeding from the natural tranſpiration being repreſſed! This is all: unleſs I am to add, that it would teach us the practical leſſons of digeſting, exfoliating, mundifying, incarning, and cicatriſing wounds of the ſcull.

I am not aſhamed to have detained you with a preliminary ſketch, which will enlarge your conceptions, and extend your views, and make you leſs unwilling to part with the prejudices eſtabliſhed by time and preſcription, conſecrated by high authorities, and intermixed † with every part of learning. It may ſeem ſuperfluous to remind even a tyro, that bone lives, grows, and is nouriſhed; it may ſeem wic-

* "Rem autem ſecus ſe habere, et ratio et experientia demonſtrant; ratio, quidem, quoniam oſſe contuſo CONSTIPANTUR ejus *pori prohibeturque eventatio et labefactatus natibus, calor ut neceſſarium* ſit ex incocto alimento ichores pravos ſuboriri, *et elevari halitus, qui, cum eis non pateat exitus*, primus os contuſum inficiunt, inflammant, atque corrumpunt, deinde quod ſanum erat uſque ad membranam. Hæc autem, cum pluribus ligamentis connectuntur cum cranio, fieri non poteſt, quia ligamenta, quæ cum emortuo oſſe copulantur, putreſcant, atque ſupra membranam ipſam colligantur ichores pravi, qui et propria qualitate, et halitibus quos emittunt ipſam meningem male afficiunt, ac inflammant." *Magatus*, p. 188.

† My reader would ſurely be amuſed with the conceited and pragmatical manner in which the old ſurgeons deſcribed theſe important proceſſes. In a caſe where, upon opening in a boy a large tumor on the ſcalp, the ſurgeon found the ſcull black and carious, he deſcribes the caſe in theſe words: "Vulnus autem tractavi primo digerentibus, ſecundo mundificantibus, tertio incarnantibus, et denique quarto cicatizantribus." Sculteti, Appendix, Caſe xvi.—One may eaſily imagine, that they would act, with much deliberation and dignity, the ſcene they ſo formally deſcribe.

ked and malicious to revive the memory of obſolete follies, only to make them the ſubject of wanton ridicule, while our own beſt knowledge is yet far below the level of truth, and is probably deſtined to become the ſport of future theoriſts. But there are ſome follies which it is uſeful to know, and I am perſuaded that this rude fore-ground which I have preſented of rubbiſh and ruins, while it enriches the general ſketch, will ſerve to make the diſtance clear and intereſting.

To this kind of philoſophy every fact is adverſe; and it muſt be a matter of wonder, that men could practiſe our profeſſion, and ſee bone occaſionally ſubject to all the diſeaſes of the ſoft parts, without being conſcious of its life and circulation. The ſkull is a part of the living ſyſtem, not leſs dependent on the general circulation, not leſs intimately connected with the ſurrounding parts, not leſs ſubject to diſeaſe and death, than the moſt delicate and vaſcular membranes of the body; and its ſlighteſt injuries draw after them the moſt diſmal conſequences, for it defends the moſt important organ of the body. But, before we enter on the pathology of the ſkull, it cannot be ſuperfluous to reflect for a moment on thoſe conceptions of the ſtructure of bone in general, which the inquiries of modern pathologiſts naturally ſuggeſt.

The form and ſtructure of every bone is determined in the arrangement of its arteries, long before the bony-ſecretion begins; and, in the courſe of years, the ſize and ſhape of the bone are accompliſhed by the gradual ſecretion of that animal earth which gives it ſtrength and firmneſs. When we inject the bones of an infant, we perceive, by our ſenſes, that they are vaſcular in a high degree, proportioned to that profuſe and continual ſecretion for which this vaſcularity is deſtined. When we give madder along with its food to an adult animal, we find, from the manner in which all its bones are tinged, that this ſecretion is perpetual and inceſſant; that the health of the bony ſyſtem conſiſts in the ſound action of its veſſels, and that the firm or earthy parts of the bones is continually ſecreted and abſorbed. When, having injected an adult bone, we diſſolve its earthy parts in nitric acid, and waſh them away, we find that it has loſt nothing of its vaſcularity, which ſeems, on the contrary, to have increaſed with its growth; and, when a bone is fractured, we find that this vigorous ſecretion is ready to replace the loſt, or to re-unite the broken parts of the bone with callus, which callus is, from its recent ſecretion, more vaſcular than bone. Every diſeaſe, every operation, every diſſection, proves to us, that this active circulation in the veſſels of a bone is unceaſing. In amputation, the ſurgeon ſees the bone, eſpecially its cancelli, ſtreaming with blood. In trepanning the ſcull, blood bubbles up through the hole, long be-

fore he has reached the dura mater; and, when his ſaw tears up duſt only, and that dry and bloodleſs, he is conſcious that the bone is dead. A bone bruiſed is ſo far ſuſceptible of ecchymoſis, that extravaſations of blood may be ſeen amongſt its lamellæ. A bone cut up by the wound of a ſabre may be re-united like any ſoft part. A bone laid naked, if it do not die, granulates, and adheres with the other parts. A bone, when ſo injured by blows, by fire, by cauſtics, by venereal, or other diſeaſes, that it muſt die, grows black, juſt as the ſoft parts blacken by ſphacelus, and ſeparates with granulations ſprouting from the neighbouring bone, as ſphacelated parts ſeparate from thoſe which are ſtill alive. The entire ſhaft of a bone, when thus diſeaſed, and rejected as dead, is diſcharged ſlowly, and often in fragments, through the ulcers, while the ſurrounding membranes, and the ſtill healthy heads of the bone, are producing a new ſhaft ready to ſupply the loſs. Often from the ſurface of diſeaſed ulcerating bones ſpring up ſoft fungi of very rapid growth; and, when a fracture is tormented with perpetual motion, or from impatience, ill health, or want of care, the parts are prevented from re-uniting; or when, from a blow or bruiſe, a bone is thrown into diſeaſed action, and its veſſels kept in a ſtate of continued excitement;—the bony ſecretion, having no limits, forms a tumor, ſolid as the bone from which it ſprings, uſually cancellated, often having in it cavities filled with pus, and conſiſting of a ſecretion, partly cartilaginous, partly bony, and ſo maſſive, as to load the part with its bulk, or not unfrequently to deſtroy it by its preſſure.

The ſcull is highly vaſcular, has various ſources of circulation and nouriſhment, and is peculiarly tenacious of life; but all the phænomena connected with complicated ſtructure, are, by the uſual methods of teaching anatomy, induſtriouſly removed from obſervation. The ſcalp is claſſed along with the common integuments, diſtinguiſhed only as being peculiarly vaſcular. The ſcull is deſcribed along with the bones, each bone is ſeparately deſcribed, and the forms, and proceſſes, and holes of theſe bones, occupy ſo entirely our hours of ſtudy, that we form no conception of any thing but thoſe forms: The dura mater, again, is deſcribed along with the brain, as its peculiar covering, and nothing obſerved but its connections, and eſpecially thoſe proceſſes by which it protects the cerebellum, or divides the hemiſpheres of the brain. It is by this anatomical method that every thing truly intereſting is removed from our notice; and the imagination or reaſon being allowed no ſhare, we are taught to ſtudy anatomy as a taſk of the memory only, without one laudable or uſeful purpoſe.

The integuments or ſcalp, *i. e.* the ſucceſſive layers of the ſkin, occipito-frontalis muſcle,

cellular ſubſtance, and pericranium, are cloſely connected with each other, and with the ſcull, by one continued tiſſue of veſſels. When theſe integuments are ſeparated from the ſcull, even in the diſſection of the dead body, the ſcull ſweats out drops of blood from every point of its ſurface. The outer table of the ſcull is ſo plainly alive, that the ſurgeon can perfectly judge of its death: when alive, it is moiſt, clear, and bleeds upon being perforated; it is by its dryneſs and faded colour, and its bloodleſs appearance, (and when trepanned), by the dryneſs of the duſt turned out in ſawing, that the ſurgeon is able to pronounce it carious and dead. The ſcull is nouriſhed, yet not altogether dependent for its circulation on its perioſteum and ſcalp: a piece of ſcalp may not only be raiſed by a clean cut of the ſabre, and laid down again ſo as to adhere to the bone, as to any ſoft part, but being cut off, it is replaced, in part at leaſt, by granulations from the ſcull. The integuments not cut, but lacerated, whirled off from the ſcull, flapped down over the face and ears, ſoiled with earth and mud, will, upon being cleaned, and laid in their place, adhere to the ſcull.

The ſcull re-unites thus eaſily with the integuments, from having every eſſential proviſion for life and circulation within itſelf. Anatomiſts ſtudying merely the anatomy, have deſcribed the ſcull as compoſed of two tables, with intermediate cancelli, or net-work of bony fibres; theſe cancelli are deſcribed as uſeful in the cylindric bones for enlarging their bulk, without augmenting their weight, or as cells fitted to contain the marrow which is to lubricate the bone; and if ever theſe cells have been regarded as vaſcular, it is as having a vaſcularity appropriated to the ſecretion of marrow. The theoriſt, thus occupied in deſcribing a bone, is reminded of nothing but its fragility, and the danger of its wanting oil. The practical ſurgeon, on the contrary, when he ſees the cancelli in amputations red as fleſh, and ſtreaming with blood, or when, in trepanning, he ſees blood guſhing up through the trepan-hole, is conſcious that this interpoſed cancellated ſtructure is the centre of circulation and nouriſhment to the bone, and that the cellular ſubſtance which ſurrounds the ſoft parts to nouriſh them, muſt, in bone, be thus depoſited in the centre, that it may be maintained in its form, and make a part of the common ſtructure of the bone. It is from this arrangement, and from the perfect protection of its cellular ſubſtance, and circulating ſyſtem of veſſels, that bone is peculiarly tenacious of life. The thigh-bone may be broken into fragments; many of theſe may be ſo diſplaced, as to ſeem ſeparated from all natural connection with the bone; yet the circulation of each piece ſurvives; and, though the detached fragments are ſmall, the bone ſhortened, and twiſted in-

to the moſt uncouth forms, each part lives, and is aſſimilated into the general maſs of vaſcularity, by which the particular pieces are made to adhere, and callus is in the end ſecreted, ſo as to re-unite them firmly. So is it with the ſcull, of which large and broad pieces are often apparently inſulated by fractures, ſurrounding the piece of bone on all ſides; and the ſurgeon, having performed the operation of trepan, paſſes his probe or finger into the hole, and is conſcious that the dura mater is as completely detached from the internal, as the pericranium is, by laceration, or by ſcraping, from the external ſurface of the ſcull; and yet ſuch inſulated pieces circumſcribed by lines of fracture, after being depreſſed by violence, are as violently raiſed by working with the levator; the ſurgeon believes that he ſhould in duty pull them away, and yet is fearful of doing harm; they are left ſlightly connected with the ſcull, and very ſlight, if at all with their own nutritious membranes, and yet they live, and are re-united, and granulate, and heal. Bone is univerſally, from the firmneſs of its ſtructure, tenacious of life; and the almoſt detached portions of a fractured tibia, and the rudely-elevated fragments of a fractured ſcull, thus preſerving their circulation, would almoſt perſuade us, that a piece of bone, like a tooth deſtined for tranſplantation, might altogether be detached, waſhed in water, and re-committed to its place, ſo as to adhere.

The circulation thus maintained by the pericranium from without, and maintained ſo vigorous in the ſtructure of the bone itſelf, is well ſupported from within; for, indeed, if we were to aſſign the nouriſhment of the ſcull to any one ſource, it would be to the dura mater, which is more properly the internal perioſteum of the ſcull, than a membrane belonging to the brain; with the brain it has no vaſcular connection, but is ſeparated by a halitus or ſecretion, ſimilar to that of other cavities, as thoſe of the pericardium or peritoneum; with the ſcull it is ſo connected, that the ſcull-cap is in diſſection torn up with the greateſt force, and every point is covered with the ruptured mouths of delicate and bleeding veſſels.

The dura mater is very firmly attached to the whole internal ſurface of the ſcull; it is hard, firm, grates like a cartilage when cut with ſciſſars, and has a gliſtening ſurface, like the capſule of a joint: it has no appearance of delicacy or ſenſibility, for indeed it has none, ſince acids, cauſtics, and even the actual cautery, have been applied to it, and it has been cut and torn in experiments on living animals, without exciting pain. It enters very ſlowly into diſeaſed action, and has as little appearance of vaſcularity as of ſenſibility; often it is inflamed, and even ſuppurated, without changing colour, and is little affected by our moſt ſubtile injections. But the

injection, which does not change the colour of the dura mater, colours the bone, paſſes through its veſſels, and runs out from innumerable minute orifices, when the dura mater is torn away: It appears from every circumſtance, that the vaſcularity of the dura mater is deſtined for the nouriſhment of the ſcull, and may be truly named its Internal Perioſteum; and the great arteries and veins (as they are called) of the dura mater might be more juſtly deſcribed as the Nutritious Veſſels of the ſcull. Were we firſt to obſerve this vaſcular connection, and then glance our eye haſtily over the facts relating to it, we ſhould be apt to pronounce the ſcull entirely dependent for its nouriſhment on the dura mater; and that its connection cannot be diſſolved by diſeaſe, without corruption of the bone, and ſuppuration of the brain, nor detached by violence, without effuſion of blood. Yet this important ſource of nouriſhment the ſcull may alſo diſpenſe with, and live; for, in caſes of the moſt extenſive effuſions of blood under the ſcull, and where this membrane is divided from it by a thick and ſolid cake of coagulated blood, we find, that the ſcull bleeds in trepanning, and granulates during the cure; and although it may ſeem a fact difficult to aſcertain, I ſhall prove to your conviction, that the dura mater may by a ſhock be detached from the ſcull, and adhere again to it without harm, leaving unequivocal marks by which in diſſection it can be known that it had been ſeparated and reunited.

I take a pleaſure in ſubmitting to your review theſe facts, ſo oppoſite to the doctrines, and ſo inimical to the practice of the older ſurgeons; for they will teach you, if you dwell upon them, to have a perfect confidence in the powers of nature. With ſo many ſources of circulation, the life of the ſcull is very ſecure: The ſcalp, the ſcull, and the dura mater, are the ſucceſſive integuments of the brain, they mutually ſupport each other, ſo that they cannot be individually injured; and we have reaſon to believe, that when the dura mater ſuppurates, and the brain is endangered, the whole ſyſtem of this vaſcular connection has ſuffered a fatal ſhock, or the bone, the centre of that circulation, has been deadened by the blow. I fear that thoſe general concluſions, which by a ſort of anticipation I have laid before you, may ſeem more allied with ſpeculation than practice, yet are they the true and genuine ſource of your prognoſtics. The eſtabliſhing more authentically the concluſions which I have mentioned in a general way, will convey the moſt uſeful leſſons in ſurgery, and in medicine too; and I now willingly forſake theſe ſuch general arrangements, to examine the ſpecial facts by which they are to be proved.

The ſeveral integuments of the brain, the ſcalp, the ſcull, and the dura mater, are not merely contiguous; they are not merely layers of integuments of various ſolidity,

which may be diſſected and deſcribed under various denominations of parts; they are eſſentially connected as a whole, having one continuous circulation, and having their diſeaſe in common; and as the teſticle, vaginal coat, and ſcrotum, are uſually involved in the ſame common diſeaſe, and when enlarged form one general tumor; ſo the ſcalp, ſcull, and dura mater, are at times enlarged by one common exciting cauſe. We have daily examples of a limb being deformed, and degenerating into a ponderous and ſolid tumor, in conſequence of a general injury extending to the bone, and exciting the bone, in common with the ſoft parts, to a high ſtate of ſecretion. When, for example, the ſhoulder-bone is hurt by a blow, or the thigh-bone bruiſed or cruſhed by a carriage-wheel, ſo as to have the general action of the veſſels excited, without the ſtructure of the parts being deſtroyed, there enſues a general tumor of the ſhoulder, or thigh, firm, hard, and bony, which is found upon diſſection to be ſometimes a cancellated, ſometimes a ſolid tumor of the bone. In like manner, the head being injured by a blow, degenerates into a tumor, in which the brain and the ſcull are equally enlarged.

There is perhaps no miſtake more natural or frequent than this, that in caſes of hydrocephalus, the ſcull is merely diſtended by the increaſe of the brain, and becomes thinner as it diſtends; I ſhall prove to you, that the ſcull grows and forms an active part of the tumor, (a fact which is not eaſily aſcertained, ſince ſuch general injuries are uſually fatal at a very early period), and that in all caſes of hydrocephalus, while the ſubſtance of the brain is waſted, the cranium is in every ſenſe, and in all its proportions, enlarged in bulk and in ſubſtance, as well as in extent; that it even acquires in a child a ſolidity and thickneſs far exceeding thoſe of the adult.

"I was invited (ſays Trioen) by Petrus Sandra, when, in our city of Leyden, the burying-place of a certain family was to be opened. Many relations of the houſe were there to ſee the remains of their ſeveral friends dug up, and to have them replaced in new graves. Sandra, who had required my company along with him, deſired that the grave of his ſiſter ſhould be opened. "Theſe are the remains (ſays he) of a beloved ſiſter, whoſe ſcull is not yet conſumed by time, I wiſhed you ſhould ſee."

"The ſcull being diſinterred, I found it larger than was natural for one of her age. The coronal and ſagittal ſutures quite obliterated; in the bregma were two oſſa Wormiana, and two ſimilar ones in the point of the lamboid ſuture, while there was in the left and upper part of the occiput a perforation of both tables. The cauſe of theſe phænomena was related to me thus:

"While a child of no more than eight months old, a thoughtleſs ſervant-girl taking

her by both arms, toſſed her in ſport up in the air, and down again alternately, till at laſt the child's head ſtruck the frieze of the door-piece. Her cries being appeaſed, her parents willingly believed that ſhe had ſuffered no eſſential harm; but in leſs than a month they obſerved a ſillineſs and ſleepineſs in the child, the faculties manifeſtly injured, the head ſlowly enlarging, till at laſt the whole nouriſhment of the body apparently being drawn towards the head, it attained the unnatural ſize repreſented in the drawing, exceeding greatly that of an adult ſcull, while the reſt of the body ſeemed deprived of nouriſhment. Many phyſicians were conſulted, but in vain. She lived to the 14th year of her age, without growing a finger's breadth during the whole period; and this ſlight hiſtory of her condition, and the cauſe of this diſorder, alone remains *."

In all the hydrocephalic children I have ſeen grown up to years, the ſize and thickneſs of the ſcull, the ſolidity of its bones, and ſometimes the firmneſs of the ſutures, have kept an equal pace with the enlargement of the brain. The oſſific proceſs has been, as in this caſe, peculiarly vigorous; for in this young lady it is worthy of notice, that the indentations of the ſutures were obliterated, and the bones conſolidated. Indeed, it is my perſuaſion, that every part of the body, when its veſſels are diſtended, or otherwiſe excited to increaſed action, muſt grow: Sometimes preſſure, ſometimes a blow, ſometimes diſeaſed action, (as ſyphilitic), ſometimes an increaſe of weight, as in diſeaſes of the breaſts or teſticles, ſometimes the irritation of a foreign body, as a piece of ſtick thruſt through the ear

* "Fæcundiſſimi ac doctiſſimi viri, Alberti Alberthomæ, ſacrorum myſtæ fæcundiſſimi Lugdini Batavorum Funeralia celebrandi cauſa, tumulus familiæ loculis quondam repoſitis erat evacuandus; qua occaſione conſanguinii, ut plurimum, ſeſe iſtunt, ut videant, quorum cineres ſuperſint, ac novis indigeant repoſitoriis: huic actui intereſſe, unus illorum Petrus Sandra Medicinæ Doctor rogavit, atque defuncte ſuæ ſororis urnas effodere juſſit: HÆC CONTINENT (inquit) AMATÆ SONORIS CINERES, CUJUS CRANIUM, SI NONDUM TEMPORE ABSUMPTE, MONSTRARE TIBI ES ANIMUS; hinc aperto conditorio ſequentia in eo notandi mihi præbuit facultatem. Molem ratione ætatis ſolito majorem, oſſium bregmatum frontiſque obliteratas ſuturas, circa fonticulum duo oſſa wormiani, ut plurimum in Lambdoidaea ſincipitis cum occipitis oſſa conjungente reperiunda ſimillima, in parte occipiti ſiniſtri ſuperiore foramen in meninges perium, animadverti; quorum phænomenum cauſam ſequens narrabit hiſtoria.

"Ambabus ulnis dum infantem, hoc tempore octimeſtrem, jocandi cauſa in altum tollit, ac reciproce demittit ancilla, tandem illius occiput in epiſtylium laquearis porticulæ ingreſſum ornantis incutit. Compoſitis vociferationibus, contuſionem nullius momenti habuere parentes; altero vero menſe vix elapſo, filiolæ inſipientiam, eam ingenii facultatibus orbam, ac inertem obſervaverunt, pedetentim augeri cranium, ſenſimque in hanc, quam exhibet archetypum, evaſiſſe molem, adeo ut ſuccus nutritius cæteris corporis partibus negatus, ſoli capiti proſpicere ſtuduerit; interim nulla non in auxilium vocata, abſque frugæ tamen: vixit in annum nativitatis ſuæ decimum quartum, quo temporis intervallo ne latum ad creverat unguem, ac poſte fata hanc nobis reliquerit hiſtoriam."—*Trioen Obſervat. Med. Chirurg.* p. 23.

or lip of a ſavage, or a ſkewer ſtruck into the liver of a fowl, is the exciting cauſe. Vaſcular action will increaſe the natural ſecretion; and a tumor thus produced and continued will have no limits to its growth, but muſt increaſe while the blood circulates, and its own ſtructure remains entire.

Caſe, by Aurivellius, of a woman born of healthy parents, (her father a ſoldier, her mother a hale and ſtout country-woman, herſelf one of four healthy and thriving children, born by her mother to the ſame huſband), who died of hydrocephalus, aged 45.

"This woman was born ſound and healthy, without viſible ſpot or blemiſh, but ſoon after birth was attacked, as the children of the lower people often are, with ſcald head, which was cured by being powdered with the duſt of worm-eaten wood. When the child was about ſix months old, the head began ſenſibly to increaſe in ſize, and extended continually; the face and body meanwhile growing very ſlowly, inſomuch that, at adult years, while the head was of gigantic ſize, ſhe had the ſlender body of a child ſix years old. Such was the weight of the head, that ſhe never could raiſe it; nor had ſhe ever been able to ſtand, but lay always in bed, unable to turn, or even to convey food to the mouth, the right hand being paralytic; yet in this condition ſhe enjoyed ſuch health as to ſurvive the infantile diſeaſes. She ſuffered the meaſles, the ſmall-pox, and a ſort of intermittent fever; ſhe continued during childhood to have frequently bowel-complaints from worms, and was often tortured with toothachs, from corrupted teeth. She ate heartily, and was fond of aſtringent wines. But always when raiſed up in bed, ſhe was ſeized with eructations, and inclination to puke. All the excretions were regular, and from the age of puberty, the menſes, though ſparing, and ſomewhat pale, flowed with great regularity.

Thus ſhe continued to live, and not only attained to puberty, but ſurvived to the fortieth year with very perfect ſenſes, and a degree of reaſon. Her face was ſilly like that of an idiot, continually inclined to laugh, the mouth gaping, the ſaliva flowing over the lips, and the ſpeech very indiſtinct; yet ſhe diſputed violently with thoſe who ſaid ſhe was an idiot. Her mother bewailed her fate with ſobs and tears, but was conſoled by the contented ſtate of her child, who aſked her why ſhe cried?—that ſhe had no reaſon to cry. She uſed to command, and to be eaſily offended. She knew thoſe whom ſhe had once ſeen, and was able to diſtinguiſh the rank and circumſtances of thoſe who viſited her. When, the year preceding her

death, her picture was drawn, ſhe wondered, and inquired very anxiouſly the reaſon of what was doing. She was anxious to cover herſelf decently, and ſpoke to her mother about receiving any new viſitors with reſpect. She had learnt from the clergyman ſome ſhort prayers: in ſpite of all the pains he beſtowed on her, ſhe never could be taught to read, but acknowledged God in Chriſt, in whoſe name ſhe was baptized. She died ſuddenly in the forty-fifth year of her age.

"The body being given for diſſection, the head was found of an enormous bulk; the abdomen was alſo full in proportion to the reſt of the body, but the breaſt, neck, and limbs, were thoſe of a child. The forehead was broader than the occiput, and meaſured three-fourths of a Swediſh foot. The back acroſs the ſhoulders meaſured exactly the ſame.

"There was in the ſpine a double lateral curvature, and the thorax followed this curvature, ſo that on the bulging ſide the ribs were far diſtant, but on the other ſide twiſted and plaited over one another. The one haunch was in like manner higher than the other, while the legs were ſo ſtrangely diſtorted one way, that the one leg was turned towards the inſide of the thigh, the other towards the outſide of the correſponding thigh. In the thorax and abdomen there was nothing irregular, except the diſtorted poſture of the viſcera, and their ſmallneſs, proceeding from the diſtortion and littleneſs of the body, and the peculiar ſize of the veſſels going towards the head, which were much larger, in proportion, than thoſe going to the lower part of the body. In the integuments of the head, nothing particular was obſerved, nor was there the ſmalleſt appearance of effuſed ſerum. But the cranium adhered ſo firmly to the dura mater, that it could not be torn off without violence, when a profuſion of limpid water ruſhed out.

"The ſcull-cap being torn up, and along with it the adhering part of the dura mater, the brain itſelf appeared. And as the head (laid out for diſſection) hung backwards, the brain ſeemed like a bladder, pendulous, and partly full of water. On its ſurface appeared no veſtige of convolutions; it was like a plain and extended membrane: being more freely opened, water flowed out, and the ſubſtance of the cerebrum was found not to exceed a twelfth of an inch in thickneſs, while yet the diſtinction betwixt the internal white and medullary, and the external cineritious or cortical ſubſtance, was perfect. It would appear that the water had been collected in the proper ventricles of the brain, but the bottom of theſe cavities had loſt their natural forms, the eminences were flattened, and the thalami nervorum opticorum ſo ſeparated from each other, that the anterior commiſſure of the brain was diſtinctly ſeen. But, on the baſis of the brain, in the cerebellum, in the crura

cerebri, or medulla oblongata, or the exit of the nerves, nothing unuſual was obſerved.

"Such was the enormous ſize of the ſcull-cap, cut off in the uſual manner above the orbitary hole, by the margin of the ſquamous ſuture, that it held nine pounds of water; and ſo remarkably was it changed in form, that you would have miſtaken the fore for the back part of the ſcull, for it was in all dimenſions ſo much larger towards the forehead and ſinciput, than towards the occiput, that to an unſkilful perſon, or upon a ſlight glance, the fore-part would have ſeemed to have been turned backwards: The ſcull was broadeſt at the wings of the ſphenoid bone; thence it gradually contracted towards the occiput, where it was extremely narrow. The forehead projected remarkably over the ſockets of the eyes and the root of the noſe, not with that gradual ſlope which is natural to the forehead, but riſing ſuddenly and perpendicularly towards the vertex. Nor were the ſides or temples of their natural flatneſs, but round and bulging; the meeting of the parietal bones in the ſagittal ſuture was raiſed, not in one point only, but in all its length, like the ridge of a penthouſe; but all the reſt of the head was ſo globular, that the uſual prominences in the centres of the bones were not perceived.

"To convey a ſtill more correct idea of this deformity, here follows a table of the dimenſions, compared with the dimenſions of two natural ſculls.

TABLE.

	In calvar. morboſ.	In calvar. perfect.
Convexitas, a glabella per verticem ad locum oppoſitum occipitis,	147	96
Convexitas lateralis ſuturæ coronalis,	132	70
Convexitas ſuper gibboſitates oſſ. vertic.	136	89
Circumferentia,	220	180
Alitudo maxima,	50	25
Axis ſectionis major,	70	65
Axis calvariæ maxima intermedium frontem et occiput præcidenti altior,	76	65
Axis ſectionis minor,	53	48

"In reſpect of thickneſs, it differed very little from that of the natural ſcull of a woman; it was thickeſt in thoſe parts where ſtrength is required; all the ſutures were

cloſe, and in many places the bones inſeparably joined. The coronal ſuture is perfect in all its ſemicircle; there are many oſſa triquetra, ſmall at the ſides, hardly diſtinguiſhable, but larger towards the vertex, and ſurrounded by ſutures, ſo as to preſerve to them the form of diſtinct bones. The parietal bones are at the fore-part entirely united, ſo that on the external, as well as on the internal ſurface, there is no mark of the ſagittal ſuture; but, towards the back-part, they are ſeparated by a complete and open ſuture, formed with ſmall indentations, from the upper extremity of which goes off a ſimilar ſuture, terminating in firm bone. The whole of the lambdoid ſuture is alſo viſible, and is interrupted, like the coronal, with many ſmall bones, and from the lower part of this lambdoid ſuture, two other ſutures run upwards into the parietal bones, that of the right-ſide joining with the fore-mentioned irregular and retrograde branch of the ſagittal ſuture, ſo as to comprehend within the lines of thoſe three ſutures, an os triquetrum, an irregular bone of no leſs than four inches in length, united in a ſmall part of its circle with the right parietal bone. Innumerable ſmall bones formed the two ſquamous ſutures, which, being ſeparated on one ſide of the head by the maceration, left large openings.

"The ſkeleton, in general, was that of a grown woman, without the ſlighteſt mark of the place of the epiphyſis *."

* Dicta muliercula, Catharine Olair Filia, patre orta erat robuſto, gregario militi; et matre pariter vegeta, ad hunc uſque diem ſuperſtite, quæ tres alios liberos ex eodem patre pepererat, ſanos eoſdem vegetoſque. Nullum dicebatur ex materno utero cum vitæ uſura tuliſſe vitium, aut nævum ullum. Non diu vero poſt nativitatem, caput faciemque mala ſcabies occupaverat, quam ut depelleret mater, farinam adſperſerat ligni putridi, a vermibus eroſi. Circa ſextum poſtea ætatis menſem ineuntem, caput manifeſte cœperat tumere, et continue dein magis magiſque intumuerat, facie interea ac reliquo corpore exigua admodum incrementa capiente; uſque eo, ut in adulta etiam ætate, illi gigantia magnitudo, huic puellæ ſex, vel ſeptennis tenera ſtatura fuerit. Inde caput ipſa nunquam potuerat erigeri; nec pedibus inſiſtendi periculum unquam fecerat, lecto per continuos annos adfixa, in qua nec vertere ſe ipſa valuerat, nec cibum unquam ad os adferre, dextra manet ſemper impotens. Nihilo tamen minus ſuis in cunis, præter ſpem et vota, vitam ita traxerat, ut feliciter et morbillis defuncta eſſet, et variolis, et febre quadam intermittente; ac præterea conſtanti ejus morbo non ſe adjunxiſſent, niſi infantilibus annis tormina a vermibus, poſteaque frequentiores dentium dolores, unde plurimam hi partem exiſi fuerunt. Cibos fere ſemper bene appetierat, maxime quæ guſtum delectarent, ut lacticinia; quin etiam placuerat vinum aduſtum. Sed tamen erecta quoties teneretur, ructibus et ſenſu inſtantis vomitus vexata fuerat. Excretiones communes plerumque rite proceſſerant, et ſexui proprias a pubera ætate regulariter habuerat, ſed parciores tamen quam eſſe ſoleant, pallidioreſque.

Sic non adultam modo, ſed quadraginta annorum ætatem aſſecuta, ſenſibus externis ſemper valuerat, et rationis uſu, non multo quidem, aliquo tamen erat gaviſa. Vultu ad riſum compoſito, hiante ore, et defluenta ſaliva, loquela item indiſtincta, fatuæ ſpeciem perpetuo exhibuerat; ſed fatuam tamen, ut putarent alii, ſe non eſſe acri-

Thus do we remark the whole head growing, and the ſcull increaſing, at once in extent and thickneſs, when excited by a blow. We are conſcious, that diſten-

ter contenderat. Matrem filiæ ſortem cum gemitu et lacrimis conqueſtam, ſolita erat conſolari, ipſam ſe contentam profeſſa, nec eſſe poſtulans, cur funderet illa lacrimas? Imperitaverat aliis, et offenſa iras conceperat. Quos ſemel viderat, agnoverat redeuntes, et a domino diſtinxerat famulum. Altero ante mortem anno, quum adveniſſent, qui faciem et corporis habitum pictura effingerent, ejuſmodi rei curioſe quæſitaverat cauſam; de corpore tegendo ſolicita fuerat; ac ſimul de novis hoſpitibus bene recipiendis matrem rogitaverat. Precum unam alteramve formulam breviorem addidicerat, ſed quacunque ab eccleſiæ miniſtris adhibita opera, literarum characteres, quantum ad libros legendos ſufficerat, non didicerat dignoſcere. Deum ſi habere profeſſa erat, quem Chriſtum nominaverat, a quo eſſet baptizata. Miſeram vero vitam, quum quadraginta quinque annos duraverat, tandem ſubita mors abrupit, anni M,DCC,LXI. menſi Maio, ad finem vergente.

Contemplationi anatomicæ traditum cadaver mox capitis enorme exhibuit volumen; abdomen itidem, pro reliquo corpore, magnum; faciem vero fronti ſubjectam, collum, thoracem, artuſque omnes ejus magnitudinis, quæ puerili ætati conveniat. Frons occipiti latior, pedis ſuecici tres æquabat partes quartas, quæ fere menſura ſummum etiam dorſum ab uno humero ad alterum emetiebatur. In latera duplici flexu curvata dorſi ſpina thoracis latera, ſuperioris flexus modum ſequi ſic coegerat, ut ab uno latere, quod magis exſtabat, magis inter ſe diſtarent, coſtæ, ab altero, quod compreſſum, propinque et imbricatim fere adjacerent una alteri. Sic et coxa una altera altior. Arcus autem inferiores mire contorti; ita ut cruris prior pars femoris parti, in uno, interiori, in altero, exteriori, reſponderet; cruro vero poſitum pedes ſequebantur.

In abdomine et ſubjecta pelvi, pariter atque in thorace et collo, præter id, quod flexa ſpina, et coxarum diſpar altitudo, in partium ſitu mutaverant, præterque dictam ſupra partium exiguam molem; ſola mereri attentionem videbatur morboſa vaſorum ſanguiferorum proportio, quæ partium magnitudini diverſæ ita reſpondebat, ut, quæ ad caput aſcenderent, arteriæ ampliores multo illis eſſent, quæ ad inferiora artuſque digrederentur. Tanto autem magis a ſani corporis modo deflexerat tunc cerebrum, tunc ejus oſſia camera, quæ, ad viſcus tam nobilem defendendum facta, ad hujus ſe format figuram. In externis ejus integumentis, præter diſtentionem nihil obſervatum eſt inſoliti, neque inter ea ſtagnantis aquæ repertum vel minimum. Calvariæ autem quum arctiſſimi craſſior cerebri membrana adhærerit, removeri iſtius fornicata portio ſine violentia non petuit; ex quo accidit, ut mox ſub hac opera limpidæ aquæ magna copia erumperet. Detractis ſic et calvaria, et quæ huic adfixa manebat craſſior membrana, cerebrum comparebat flaccidum, in eo, quo tenebatur examinandum caput, ſitu, poſteriora verſus dependens, veſicæ inſtar, quæ aliquo intus contento humore partim concidit, partim pindula eſt. Nulla in ſuperficie conſpiciebantur flexuum aut aufractum veſtigia, ſed membranæ in modo et qua expanſio. Plenius vero detecto, quod intus erat, cavo, ex quo reliquia tum defluxit aqua, diſſectum cerebrum vix linea craſſius inveniebatur; et nihilo tamen minus interiorem medullarem portionem ſuus ubivis albor, ab exteriore cinnerea, quam corticalem dicunt, evidenter diſtinguebat. Fundus ſpatii, intro quod aqua ſtagnaverat in ventriculis cerebri lateralibus collectam illam ſatis manifeſtabat: ſed a ſolita ſpecie admodum differebat, depreſſa colliculorum figura, et thalamis nervorum opticorum ita ab invicem deductis, ut mox in conſpectum caderet commiſſura, quam dicunt, cerebri anterior; tum et fibrillis irregulariter poſitis, quæ ad cognitas partes, et ſuis diſtinctas nominibus, referri non poterant. Circa nervorum aut origines nihil animadvertebatur inſoliti, neque circa cerebellum aut medullam oblongatam. Ultra rem ſcrutari, diligentiori digniſſimam contemplatione, tempus et circumſtantiæ prohibebant. Neque diſcerni juſte poterat, e lateralibus ne cerebri ventriculis, per tertium in quartum, atque ſic ulterius in ſpinæ dorſi canulem, ante diſſectas, et tum inundatas partes, aqua deſcendiſſet, ſummam licet habeat veriſimilitudinem, per apertas ſano in ſtatu vias debuiſſe deſcendere.

tion, merely, is in this, as in all cafes, an excitement, and that when the diftention is from within, from an idiopathic hydrocephalus, the bones, though often not

Calvariam etiam adhuc, dum fuperfuerit, attentius inſpicere licet. Tantæ eſt amplitudinis portio ſuperior fornicata, quæ cerebri contemplandi gratia, conſueta ſectione, proxime ſuper oculorum foramina ſummaſque partes futurarum ſquamoſarum, ab inferiori ſeu baſi, fuit ſejuncta, ut aquæ novem libras ceperit; quum ſimiles portiones, ex calvariis hominum adultæ ætatis et conſpicuæ ſimul ſtaturæ, libras vix capiant quatuor. Sic diſtenta, perfectam quoque formam uſque eo deſeruit, ut aliqua ex parte contrariam receperit. Capacior enim multo, omnem demenſionem, ad ſinciput et frontem, quam ad occiput eſt; ita ut qui levius, vel oculo minus perito, adſpexerit, priora verſus poſita fuiſſe judicet, quæ poſteriora ſpectarunt. Latiſſima eſt, qua oſſis multiformis proceſſus oſſibus frontis et verticis ſe annectunt; inde ſenſim primum auguſtata, ad occiput multum contrahitur: frons protruſa valde ante oculorum cava, non depreſſa illa, qua ſolet acclivitate, ſed altiori multum ductu ad ſinciput aſſurgit: latera minus quam in adultis ſaniſque compreſſa ſunt, et lacunar ipſum admodum ſupra ordinariam altitudinem eminet, in futuræ coronalis medio altius aliquantum reliquo, ita tamen, ut per ſummæ longitudinis magnam partem eadem fere regnet altitudo; ceterum ad ſphagiæ convexitatem undique accedit, ut, quæ alias in oſſibus verticis exſtant, tubera non deprehendantur. In qua deformitate, ut melius pateat, quibus in locis a conſuetudine naturæ longius receſſerit, ſequentes notavimus menſuras, tum in morboſa quam deſcribimus calvaria, tum in binis calvariis ſimiliter ſectis, et illas inter, quæ ad manus ſunt, majoribus.

	In calvar. morboſa.
Convexitas, a glabella hoc verticem ad locum appoſitum occipitis,	147
Convexitas lateralis futuræ coronalis,	132
Convexitas ſuper gibboſitates oſſ. vertic.	136
Circumferentia,	220
Altitudo Maxima,	50
Axis Sectionis Major,	70
Axis calvariæ maxima inter medium frontem et occiput, præcedenti altior,	76
Axis Sectionis Minor,	53

Quarum menſurarum differentiæ, ſi cum menſuris perfectæ ſtructuræ conferantur, patebit, ad ſuperiora præcipue, et maxime quidem ad priores horum partes, diſtenendi vires fuiſſe directas. Craſſitie a calvaria mulieris robuſtæ vix differt, craſſiſſima item illis in locis ubi perfecta ſtatura poſtulat. Tota vero futuris clauſa eſt, immo alicubi oſſibus in unum conſolidatis. Sutura coronalis integrum ambitum ſervat, ſed tota officulis referta, exiguis quidem ad latera et firmiſſime cohærentibus, majoribus autem ad ſinciput et laxius connexis, ut diſtincta oſſa referant. Verticis oſſa, dimidia ſua contactus parte, eademque priore, in unum prorſus coaluerunt, et æquabiliſſimum, tam intrinſecus quam extrinſecus, exhibeant ſuperficium; reliquam et poſteriorem partem futura diſtinguit laxa denticulis facta exiguis, a cujus extremo ſuperiori dextroſum et retrorſum ſimilis excurret futura, in ipſo primo oſſe finiens: Lambdoidea tota ſupereſt, itidem officulis plena, admodum quidem exiguis in inferiore utrinque parte qua ad ſquamoſam accedit: a convexitate vero hujus futuræ, binæ aliæ in verticis oſſa excurrunt, una utrinque quarum quæ dextra eſt, directione reſpondet futuræ illi modo memoratæ a ſagittali retrogradæ, ut his tribus futuris diſtinctum includatur os, quatuor pollicem longitudine, exigua ſui portione cum verticis oſſe dextro coalitum. Squamoſas conglutationes officula formabant minutiſſima, numeroſiſſima, ut ſub maceratione, ab uno latere contineri omnia ſcio ſitu non potuerint, ſed decidua majores reliquerint hiatus.

close in their sutures, nor firm in their texture, grow to an enormous size. Of a child, for he may be called a child, fifteen years of age, whose cranium has expanded to an enormous size, with bones of great size and solidity, I have here given a correct drawing, with a short description of the case.

OF INJURIES OF THE SCALP.

LET us then turn from relations extraordinary, and almost incredible, insolated, as it were, by their magnitude, and therefore ill suited to form precedents, to facts of daily occurrence, and plainly useful, the examination and detail of which may ripen your judgement, and qualify you for practice. The most extensive lacerated wounds, and widest fractures, are less dangerous than the slightest bruise of the scalp, or contusion of the scull; a truth which should awaken your attention to every doubtful appearance, and slighter sign of danger; and lacerations of the scalp very generally prove the doctrine which we have just laid down, that the natural powers are sufficient for almost every exigency, and that it is easy, however extensive the separation, to re-establish the connection of the scalp with the scull. The tyro in surgery must not only be convinced from hypothesis, but remember by the direct inference from facts, that the largest flaps of lacerated scalp are easily re-united with the remaining scalp, and with the bone.

The most extensive laceration, and the first I ever witnessed, was that of a servant, who, in riding a pair of wild horses to water, was unable to command them; they turned furiously, and galloped under an arch; he laid his head down by the neck of the horse he rode, but too late to escape the blow; the sharp end of the stone, catching the scalp obliquely on the right side, cut it up with an incision as clean as that of a tomahawk, and whirled it back over the occiput and left ear, uncovering much of the right, and the whole of

Sceletum reliquum totum ætatem mulierculæ bene adultam satis testatur, quum epiphysium ne minima quidem ubi superstint vestigia. Spinæ dorsi duplicem in latera flexionem sequitur ligamentorum intervertibralium tenuitas, a parte flexuum concava, crassities, a parte convexa; quarum utraque, ut ipsa vertebrarum e justo situ deflexio, per gradus increscit decrescitque.

Ossium majorum quæ artus formant, contorta illa figura, quæ supra dictæ membrorum deformitati respondeat, hoc in loco descriptionem non postulat, quum a primo malo, quod capitis erat, minime pependerit.—*De Hydrocephalo Interno, Annor.* 45, *Præside Samuelo Aurivellio respondens. Ekmark, vid. Sandifort*, tom. xi. p. 328.

the left parietal bone. In former times, extenſive as this flap was, it would have been cut entirely away, to make room for dreſſing and exfoliating the naked ſcull. This man was not treated ſo coarſely, yet not judiciouſly; his head was wrapped in a poultice; when I ſaw it, the ſcalp was retracted, and curled up, and thickened, ſo that it never could be unfolded again, nor be made to cover the whole of the expoſed bone. But, by careful treatment, it adhered to the parts below, the interſtice betwixt the edges was filled with granulations, and healed; but never did this man recover his health. From being full, florid, chearful, and happy, he became poor, emaciated, hypochondriacal, and ſickly; he imagined every poſſible diſeaſe, and had indeſcribable ſenſations in the ſcalp, ſuch as excited in my mind the firſt apprehenſion of ſome permanent diſeaſe in the ſcalp itſelf, independent of any in the bone, or within the head.

However extenſive the laceration, if the ſcull be uninjured, the ſcalp not irrecoverably bruiſed, the patient in health, and not expoſed to contagion or fever, it may (with only ſlight and partial interruptions) be made to adhere again to the bone. Of ſuch recoveries, every practical ſurgeon has ſeen examples, and many intereſting caſes, made remarkable by the circumſtances of the accident, are recorded. —"A brick-layer, of about ſixty years of age, walking incautiouſly along the ridge of a houſe two ſtoreys high, in order to lay ſome chimney-ſtones, in coming down again, he ſet his foot ſo inſecurely upon the firſt round of the ladder, that he miſſed his footing, and rolled down the tiles into the ſtreet. He fell from the height of two ſtoreys, and his head lighted ſo exactly betwixt two great ſtones, that it was wedged faſt betwixt them, without ever touching the ground, and the ſcalp, torn in the middle, (in its whole length from the forehead to the occiput), was divided into two great flaps, which were whirled down over both ears, the laceration being fully a foot in diameter. The man vomited the breakfaſt which he had juſt taken, lay convulſed in a very extraordinary manner, and was ſeized with a delirium which laſted four days, during which he ſtruggled with ſuch violence, that it was with great difficulty they got his hair cut and ſhaved, or the wound dreſſed.

"The whole ſcalp was inverted in a frightful manner, and almoſt the whole ſcull laid bare. The occipital bone, although that was the only place where there appeared no outward injury, was depreſſed. Monſieur La Motte, who was called to this man, waſhed his wound with ſpirits of wine, brought together the mangled ſcalp as well as he could, and, in oppoſition to the prejudices of all former times, and the univerſal practice of his own, covered the naked ſcull with its ſcalp,

and ſtitched the flaps together with points of the interrupted ſuture, all but one corner, which hung down over the temple, ſo ragged and bruiſed, that its ſtructure ſeemed ruined, unfit to bear the ſtitches of the needle, incapable of re-union, and ſure to fall into ſuppuration, or rather gangrene. This he was forced to cut away, but the reſt he brought ſo cloſe, as to leave uncovered a ſpace of four fingers-breadth only on the top of the head, near the meeting of the coronal and ſagittal ſutures.

This wound, great and dangerous as it was, accompanied with depreſſion, vomiting, delirium, convulſion, and every unfavourable ſign, Mr La Motte acknowledges that he might have cured it in the end, and without delay, but for ſome taint of the ſcholaſtic learning of the times, and bad leſſons learnt in the Hotel-Dieu; for, when he ſaw the cranium bare, he could not refrain from aſſiſting nature; nature had formed theſe granulations which were deſtined to re-unite the bone and the ſcalp, but he would have a previous exfoliation of the bone; and, while he was thus inclined to a regular exfoliation, and nature to a more ſimple and expeditious cure, the reſult could not be in favour of the patient. "Every morning (ſays La Motte) I found this naked part of the cranium covered with fungous fleſh, which, at each dreſſing, I ſcraped away in vain; nor did even my deſiccatives hinder its ſpringing up from day to day, till I found myſelf obliged to abandon this deſign, and dreſs with ſimple lint, never imagining that this neglect could be followed by any kind of danger. But, after dreſſing thus for fifteen days, I found the expoſed bones exfoliating. When the exfoliations began to project in the diſtant points through the fleſh, I pulled them away ſucceſſively.

"The cure I finally accompliſhed by five months careful dreſſing. During three of theſe months, the man was obliged to refrain from work. But he lived, after his cure, ten years, and worked at his trade to the day of his death. Lingering as his cure may appear, it was, nevertheleſs, abridged by the ſewing of the ſcalp, without which I have every reaſon to believe it would have been protracted for a year*."

* Cette portion du crâne qui étoit découverte, et qui occupoit, comme j'ai dit, partie des ſutures, ſe trouvoit tous les matins recouverte des chairs fongueuſes, que j'etois obligé d'enlever a tous les penſemens, ſans que cela en empêchât la régénération, quoique j'y emploiaſſe les plus forts deſiccatifs. Je l'abandonnai dans la ſuite, ſans me ſervir que de la ſimple charpie ſéche, ne prévoiant pas que les ſuites de cette attention négligée dûſſent être d'une dangereuſe conſéquence. Aprés quinze jours de ce pauſement les os s'exfolierent; et les portions d'os s'étant élevées au travers de chairs, je les tirai en trois fois differentes, et à meſure qu'elles ſe préſentoient; ſçavoir une portion du pariétal droit, une plus grande du gauche, mais une encore plus grande du coronal, étant elle

But I fear La Motte might have added, with equal truth, " Nay, it might have been accompliſhed in a few weeks, could I have prevailed with myſelf to renounce the old rules, and refrain from impertinencies which could not but hinder the natural progreſs of the cure, by occaſioning that dangerous and ſlow exfoliation of the ſcull, which I am now perſuaded was the work of my own proper hands, of my ſcraping irons, my deſiccatives, my alum, lead, and white vitriol."

The caſe, as it ſtands, is inſtructive; and the wound and the cure were ſufficiently remarkable to attract, in a provincial town, (Valognes), the attention of the vulgar, high and low. The breakfaſt of porridge which the man had rejected, while he lay in a ſtate of ſtupor, was miſtaken for brain, and the flaps laid down over each ear made the mob imagine that his head was ſplit like an apple. They believed in good faith that the ſcull was opened, and the brain diſcharged, and that the brain was baled back again by La Motte, with his two hands, into the empty ſcull, which he then cloſed up, and ſewed firm with ſtitches: What they imagined they ſaw, they reported with confidence, and " in many a company of polite and ſenſible people, I was aſked ſeriouſly, (ſays La Motte), whether it could be that I had put back the brain before ſewing the head? which I anſwered according to the character of the inquirer, or humour of the moment, aye or no *."

La Motte, in all parts of his works, ſhews much good ſenſe and obſervation; there is no innovation of which he ſeems more proud and confident, than this of preſerving and replacing the ſcalp, in oppoſition both to the prejudices of his times, and to the rules of the great hoſpital-ſurgeons, who ſeem to have been, from hurry or rudeneſs, the great corrupters of practice; indeed their ſlighteſt errors, multiplied by the imitation and improvements of numberleſs pupils, became ſerious and ſyſtematic faults of the profeſſion. After reporting a caſe of lacerated ſcalp, in which a gentleman, having fallen in his own ſtairs, had his ſcalp torn down in the exact likeneſs of thoſe inciſions which we perform in diſſection, when

ſeule plus éntendüe que les deux autres enſemble. J'achavai enſuite la guériſon de cette plaie, en continuant le méme pauſement, qui dura cinq mois avant que la cicatrice fut ferme et ſolide, dont le bleſſé en paſſa trois ſans pouvoir travailler de ſon métier; cependant ou peut dire que la cure fut fat abregée, par les ſutures que je leſi fis, qui reuſſirent tres bien; ſans quoi il n'auroit pas été quéri dans le cours de l'année. Il a vêcu encore plus de dix ans depius cette bleſſure, et a travaillé de ſon metier juſqu'a ſa mort. *La Motte*, tom. 2. p. 278-9.

* Je ne fus pas ſurpris d'entendre publier ces pauvretez à de ſimples gens, qui ont beaucoup plus de crédulité que de raiſon; mais je le fus davantage de m'entendre demander par pluſieurs perſonnes plus ſenſées, ſi cela étoit véritable; aux unes, je répondois oui, et aux autres, non, ſuivant que j'étois en humeur de rire ou d'être ſerieux. *La Motte*, p. 282. tom. 2.

we deſign to ſaw the ſcull-cap *; and in which, notwithſtanding the extent of the laceration, the looſeneſs of the flap, (which hung ſo low, that the garcon held it ſtretched in his hands till the hair was clipped and ſhaved), and its being engrained with ſand, La Motte made a perfect and ſpeedy cure by ſtitching it. He adds a ſpecimen of a very different practice, for, having been called by a country-ſurgeon to aſſiſt him in the cure of one who had a ſimilar wound of the ſcalp, uncovering the whole of the left parietal bone, he found that this ſurgeon, who had wrought long in the Hotel-Dieu at Paris, and ſeen Petit cut away every looſe portion of ſcalp, imitated unrelentingly his celebrated maſter, and cut this flap ſo clean away, as to uncover the whole parietal bone, and protract a cure to ſix months, which might have been accompliſhed by a better method in as many days †.

Such has been the practice of Sharp, of Pott, of Deaſe, and of many hoſpital-ſurgeons; and it will not be unfavourable to your recollection of this plain and uſeful leſſon, that it is connected with ſuch a man as La Motte, and with the ſurgery of the laſt age. The recollections of his own faults ſeem to bear hard upon La Motte; he is not ſo diſingenuous or ungenerous as to diſcloſe thus the faults of others, concealing his own. He relates, in contraſt with his better method, learnt from experience and obſervation, his ill practices, when he firſt went out from the Hotel-Dieu. His firſt patient had been a young girl, with a ſimple wound in the forehead, whoſe cure he had protracted, and whoſe forehead he had deformed with an unſightly ſcar, by ſeeking to procure a regular exfoliation of the bone. "Woe be to thoſe (ſays La Motte) who ſerve as ſubjects of his firſt experiments to the young ſurgeon; ſuch was the ill-fortune of my firſt patient, for, being juſt come from the Hotel-Dieu, where I imagined I had learned every thing, I began by dilating the wound with tents, hard and firm as I could make them, with the deſign of keeping the bone open, till it ſhould caſt off its ſcale, fearing the worſt conſequences, ſhould I ſuffer the bone to be covered ‡." How

* "Je trouvai, (ſays La Motte), que le cuir chevelu etoit coupe de la meme maniere que lorſque l'on veut decouvrir le crane d'un cadavre," &c.

† Mais ce chirurgien qui avoit travaillé quelque peu de tems à l'Hotel-Dieu de Paris, ou il avoit vu Monſieur Petit couper les portions des tégumens, qui ſe trouvoient dilacerez ou ſéparez de la ſorte, pour éviter un plus grand mal, comme je l'ai dit ailleurs, voulut imiter cet excellent maitre, en coupant comme lui, la portion du cuir chevelu, qui étoit détachée, et il decouvroit par ce moien tout le pariétal, et par de-la. *La Motte*, p. 457-8. tom. 2.

‡ Malheur à ceux qui ſervent les premiers d'épreuve a un jeune chirurgien, telle que fut cette premiere bleſ-

unſparingly and unrelentingly he proceeded in this work of exfoliating the bone, he next repreſents to us in apoſtrophiſing the girl, in the true Gallic ſtyle. But this reformation in his practice, which had enabled him to ſave others from the like deformity and pain, ſeems to have given him real pleaſure, as a man proud and zealous in his profeſſion.

There is another maxim I would impreſs upon your minds, that the ſurgeon muſt not preſume to decide, *a priori*, what parts of the lacerated integuments may be re-united, and what parts are unfit to be ſewed, for that is a problem which never can be reſolved but by the iſſue of the caſe. A piece of ſcalp, though irrecoverably bruiſed, cannot (though replaced, as if with hopes of its adhering) do the ſmalleſt harm to the ſcull; and we have innumerable proofs, that teguments, much lacerated, may retain their life and circulation, and that although foul with ſoil and ſand ingrained into them: ſo that even in ſuch caſes we need not ſcruple to put the uſual ſtitches into the wound, as I did, (ſays Paræus), "in the caſe of a ſoldier wounded at the Caſtle of Hedin, a little before the laſt ſiege. This ſoldier was employed, with many others, in digging earth to carry to the ramparts. The earth falling in upon one party of them, many were ſuffocated and cruſhed to death, while this ſoldier was dragged out from among the rubbiſh alive, with his ſcalp bruiſed and lacerated, and torn down from beyond the top of his head, and hanging ſo over his face, as to ſtrike his companions with horror. When I ſaw him, I called Charles Lambert, ſurgeon to the deceaſed Duke de Bouillon, to aſſiſt me. I waſhed the wound in warm wine, both to cleanſe it of the coagulated blood, and waſh away the earth; then it was well wiped and dried with a linen cloth. There was applied over the whole wound ſpirits of turpentine, with an admixture of ſpirits of wine, in which ſanguis draconis, maſtich, and aloes were diſſolved; then the flap being replaced, was ſecured with ſeveral ſtitches of the needle, (not firmly drawn, for fear of inflammation and pain, which is moſt apt to occur at the time of the firſt ſerous effu-

ſée a mon égard; car ſortant de l'Hotel-Dieu de Paris, ou je croiois avoir tout appris, je commençai à élargir cette plaie avec pluſieurs bourdonnets fort durs, dans l'intention de tenir cet os découvert juſqu'à ce qu'il fut exfolié, croiant bien faire, et prévenir le mal que je craignois, ſi je laiſſois recouvrir cet os; *mais combien n'en cauſai-je point a cette pauvre enfant, qui me le faiſoit aſſez entendre par ſes larmes, que je regardois impoitablement, dans l'eſperance d'un plus grand bien;* mais je ſous m'en corriger, comme je le fais voir par la maniere dont je la traiteri la ſeconde, à laquelle il n'eſt reſté qu'une ſi foible marque, qu'a peine s'en peut-on appercevoir; au lieu d'une cicatrice difforme reſtée à l'autre qui n'auroit paru en aucune maniere, ſi j'avois ſuivi la même méthode. *La Motte*, tom. 2. p. 445-6.

ſion), to unite the parts, and ſave them from the contact of the air." Some of the other precautions of Paræus were leſs conſiſtent with ſound principles, or modern practice; for he put into each edge of the lower part of the wound long tents, to preſerve a free diſcharge of the matter, which could not but tend to inflame the wound; and it is not eaſy to conceive how the upper end of a wound like this ſhould adhere, while its lower part was thus tortured into a ſtate of ſuppuration; beſides, there was laid over the whole head a poultice of bean and barley meal, mixed up with vinegar, while it ſhould have been kept clean and dry. "I adviſed him (ſays Parée) to retreat to Abbeville, as the enemy was prepared to beſiege us; and you may be aſſured, that after having been exchanged from my impriſonment, (for I fell into the hands of the enemy), I ſaw this ſoldier in Abbeville in perfect health."

The circumſtances of a caſe related by Mr Hill are ſo particular, that you will naturally take an intereſt in it. While the older ſurgeons cut away every portion of ſcalp, however ſlightly or partially detached, our practice is to replace confidently every lacerated ſcalp, however much inſulated, mangled, or polluted with ſoil or ſand. The caſe related by Mr Hill will leave always upon your minds a lively recollection of the fact.

"A drunk country-man, aged ſixty-ſix years, riding furiouſly along the ſtreet, was flung with ſuch force againſt the ſharp edge of a door-poſt, that about the length and breadth of a hand was ſtripped off the right ſide of his head, and laid down on the cheek.

"Some people, in the dark, took his wig out of the kennel, and, not knowing what had happened to his head, put it on full of mud, and ſqueezed his hat over it. He did not complain of his head, but complained greatly of his neck and ſhoulders.

"The dirt was rubbed into the TUNICA CELLULOSA in ſuch a manner, that it was impoſſible to clean it fully out. I therefore pulled up the looſe piece of the ſcalp, and, after waſhing and ſtuffing it with ſoft liniments, put four ſtitches into the upper part, but ſo looſely, as to allow the matter a free paſſage.

"The wound digeſted ſo well, that in five days all dangerous ſymptoms were over, and his friends carried him home without acquainting me. Having no proper perſon to take care of him, the ſtitches gave way one after another, and it healed, leaving near two fingers-breadth of the ſcull bare, the teguments lying in folds on the OS PETROSUM. This circumſtance might eaſily have been prevented by renewing the ſtitches. He, however, lived and enjoyed good health above twenty years."

Yet a laceration of the ſcalp is a ſtate of danger and uncertainty. We never can be aſſured that the bone is not too much injured to admit of its re-uniting with the ſcalp, or that the conſtitution is not too weakly, or the ſeaſon or the air unfavourable; we never can be aſſured, even when the proſpect at firſt is moſt flattering, that a laceration of the ſcalp will not be followed by a ſuppuration of the brain.

"Thomas Sharpe was an itinerant dancing-maſter, a fidler, a performer in a military band; he died trumpeter to the Dumfriesſhire militia, and had attained to all the perfection of libertiniſm, and diſſolute behaviour, that ſuch occupations naturally entail upon their profeſſors. One morning, reeling out of a low tavern, he, after ſcrambling up the ſtairs of it, ſtaggered forwards into the unguarded area of a houſe that was building, and, without any other apparent injury, had his ſcalp torn down over his face. The ſcalp was ragged in its edges, and mangled every where, with ſeveral penetrating wounds; it was ſeparated from the whole upper part of the head, from the lambdoid ſuture, backwards nearly to the eye-brow, and from the vertex to the right ear; much of the ſcull, and eſpecially of the os frontis of that ſide of the head was laid bare; nor was the oppoſite ſide without bruiſes, and leſſer wounds, for it ſeemed to have been jammed in among the looſe ſtones.

"The ſcalp was ſponged, cleaned, and dried, and ſmoothly applied again to the ſcull; and as the edges of the laceration were irregular, and bruiſed, and in no fit condition to be nicely joined with ſtitches, they were held by plaſters only, they were united in a few days with each other, and even ſeemed re-united on the lower ſurface with the ſurface of the ſcull; whatever inflammation there was, ſeemed a very natural conſequence of the general bruiſes, and leſſer wounds of the ſcalp; and we were confirmed in this good expectation, from the man's having recovered from his intoxication, and continuing in apparent health. He felt his bruiſes, and complained of the pain, ſlept well, had neither delirium, ſickneſs, nor fever, and was bled only on account of the fulneſs of the pulſe.

"On the fifth day, the little diſcharge which iſſued from the irregular openings, and ſmaller wounds, was good; the adheſion continued apparently ſound; on the ſixth, the diſcharge from under the ſcalp was more copious, and compreſſes ſoon were nicely applied to keep the ſcalp and the ſcull in contact with each other. On the eleventh day it became neceſſary, from fluctuation and ſoftneſs in all the lower part of the detached ſcalp, to make an opening over the ear for the diſcharge of matter, which flowed ſo profuſely, and was accompanied with ſuch fits of rigor, that I abandoned all hopes of any firm or general re-union, and began to fear that the brain was

DESCRIPTION OF PLATE Page 358—Vol. II.

Head of Thomas Sharpe:

Fig. 1. Sketch of the Scalp partially re-united.—A large Abſceſs above the Ear diſcharging a profuſion of Matter. —*bb* Extent of carious Bone and dead Scalp.—The Probe paſſing from the Opening *c* and *d* out by the Opening *e*, and all round from the Vertex to the Temple and Ear, betwixt the Scalp and the Bone.

Fig. 2. The Integuments laid back, and the Extent of carious Bone expoſed. —*ff* Marking the Extent of the Caries.

Fig. 3. Drawing of the Scull-cap ſawed off and preſerved.—*g* Marking the Center of the Caries.—And *bb* The deep ulcerated Furrow in the Bone by which the carious Part was circumſcribed, and which might have been miſtaken for a deep Fracture.

Fig. 1.

Fig. 2.

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in a ſtate of ſuppuration. Upon puſhing the probe through the ſoft and downy granulations which united the edges of the ſcalp with the ſcull, I was perſuaded, that all below the mere edge was diſengaged, that the whole extent of the parietal bone was rough and naked. The probe, in its progreſs between the ſcull and integuments, encountered what all my aſſiſtants conceived to be a fracture of the ſcull; yet ſtill the patient retained his ſenſes, and ſuffered little in his health.

"The ſymptoms of ſuppurated brain are, as I know from much experience, far from alarming when they firſt appear: The detached ſtate of the ſcalp, the roughneſs of the bone, the profuſion of matter which flowed through all the openings, and the ſlight rigors, dejected looks, and tremblings of the hand and tongue, though they are ſuch as alarm the ſurgeon, can hardly vindicate him in taking any deciſive ſtep. I was perſuaded that the bone was dead, and the brain in a ſtate of ſuppuration: I ſaw no proſpect of interpoſing with ſucceſs at ſo late a period as the ſixteenth day from the injury: I was ſupported by the conſulting ſurgeons in the preliminary ſtep of opening the ſcalp, and expoſing the diſeaſed bone; but they ſeemed to ſuffer a diſappointment, when that rough line, which was ſo curiouſly traced with the probe, was found not to be a fracture, and, as there was no fracture, I was, fortunately for my reputation, prevented from applying the trepan; for though there was every motive for operating, the patient died next day of a diſeaſe, inevitably fatal, connected indeed with the accident, but having no relation to the ſtate of the brain.

"Let me now, then, proceed to give you an account of the condition of this man before the operation, of the manner of his death, and of the appearance on diſſecting the body. Before the operation of cutting up the ſcalp, there were no deciſive ſigns, nor fatal prognoſtic; for of all the fatal affections of the brain, this of ſuppuration of the dura mater is the moſt inſidious in its progreſs; and our patient, before we apprehend him to be in danger, is in general beyond the reach of help. This man, though he had the cranium naked, the ſcalp in full ſuppuration, and a profuſion of thin matter pouring out from various openings, had no other ſymptoms than ſlight rigors, and no more violent rigors, indeed, than often accompany the ſlight fever of a lacerated ſcalp. It was towards the ſixteenth day, perhaps about the fourteenth, that theſe rigors were followed with a ſweating ſtage, that they became ſenſibly more frequent and violent, and that they were accompanied during the day with unuſual languor, and in the night with a ſlight delirium, which only diſappeared when he was thoroughly rouſed from ſleep. Yet, at this moſt critical period, I could not make him ſay that he had any corded feeling over the brow, any headach, any thing which might indicate to his

own apprehenſion a diſorder within. I could not perceive the ſlighteſt wavering in his intellect; I could not find, in the irritable ſtate of his pulſe, the foulneſs of his tongue, the dullneſs of his eye, in his perturbed ſleep, and alarming dreams, any thing more than the feveriſh diſorder naturally accompanying ſo extenſive a laceration of the ſcalp; and yet at that moment was the ſuppuration of the dura mater fairly eſtabliſhed, and the brain itſelf deeply tainted.

"An increaſed drowſineſs, with rigors more violent than uſual, a degree of headach, and a ſenſibility to light, induced us, upon the ſixteenth day, to cut up the ſlight adheſion of this great flap of ſuppurated ſcalp, which immediately fell over the ear, and left the whole parietal bone expoſed, in a condition perfectly deciſive, in my opinion, of the ſtate of the brain, and indeed of the patient's fate. There was a portion of the parietal bone broad as the palm of my hand, of a ſquare form, apparently inſulated from the reſt, black, carious, and elevated above the level of the ſurrounding bone, and circumſcribed by a line as deciſive as if it were a fracture. This part, which was the centre of the parietal bone, was rough, dry, and prominent, of a dark yellow colour, engrained with black ſpots like a toad's back. The pores of the bone, or, in other terms, the minute and almoſt inviſible holes by which the blood-veſſels enter it, ſeemed wide, and not red as when blood is circulating, but black. In the margin immediately ſurrounding this, where the bone was ſtill alive, and in a ſtate of ulceration, the bone was waſted, ſo that the carious part was left prominent, with a line ſo fairly circumſcribed, that, when felt with the probe, it might be miſtaken for fracture; this is indeed, uniformly the condition of a dead and exfoliating piece of the ſcull. Beyond this ulcerating circle, where the integuments and muſcles adhered, they adhered with particular firmneſs, being crammed with extravaſated blood, and hardened by inflammation. Though the certainty of the brain being in a ſtate of ſuppuration, inclined me to perforate the cranium, the certainty now of there being no fracture inclined my aſſiſtants, and the conſulting ſurgeons, to refuſe their conſent to that operation, which alone could ſave our patient; thus I was deſtined to eſcape the opprobrium of having ſhortened the life of a man, whoſe death, from a very different cauſe, was inevitable.

"He was perfectly ſenſible during this preliminary operation, and would moſt willingly have conſented to any meaſure we might judge expedient. But, when he was conveyed to bed, he ſeemed weak, his breathing was low and difficult, his pulſe, which had beat 124 in the afternoon, was this evening extremely feeble and ſlow, and he broke out into a very profuſe ſweat. His features were ſhrunk, and

his face pale and ghaſtly. About four in the morning he was ſeized with ſickneſs, and ſevere vomiting, and with a rigor, which laſted fully twenty minutes, and at eleven in the morning his breathing was extremely oppreſſed; it was painful to witneſs his ſtruggles for breath, and the anxiety and cold ſweats which it brought upon him: in half an hour after his moſt violent ſtruggle for breath, he was ſeized with a profuſe hæmorrhage from the lungs; brought up, with coughing and ſtruggling, fully a pound of florid blood, and expired: Thus, in the very moment in which he came into manifeſt danger from ſuppuration of the brain, he died from the burſting of a blood-veſſel in the lungs. What bruiſes, beſides the wounds of the head, he may have received unconſciouſly in his ſtate of intoxication, we do not know; but nothing is more likely, than that in the fall which thus hurt his head, the lungs had alſo ſuffered material injury; it is perhaps from ſuch injuries paſſing unnoticed that ſuppuration of the liver ſo frequently accompanies fractures of the ſcull; indeed, I know not how a man can fall from a height, without ſo heavy a viſcus as the liver ſuffering by the ſhock, independent of any direct blow.

"The appearances on diſſection were as follow: The appearance of the brain implies danger; but it was the diſſection of the lungs that explained his ſudden death. Upon raiſing the cranium, all that ſurface of the dura mater which lay under the diſeaſed bone was in full ſuppuration, covered with white and mature matter, and, in many points, perforated with ulceration. The pia mater, in contact with the diſeaſed dura mater, was not yet ulcerated, for the brain cut ſound and firm up to the very ſurface; yet the whole maſs of the brain was in ſome degree affected, an increaſed action of its veſſels had unqueſtionably taken place, for all the ventricles were enlarged, and full of ſerum, but not obviouſly inflamed. Thus our patient was in that ſtate of danger from ſuppuration of the brain, from which ſo few are recovered even by the moſt timely operations; but the ſudden burſting of a great veſſel in the lungs was the immediate cauſe of the death; for, upon opening the right ſide of the thorax, there was found in the lungs of the right ſide a great effuſion of blood, and a ſmall ſuperficial ulcer on the largeſt lobe of this part of the lungs.

Whether is it to the mere laceration of the ſcalp that we are to refer all this diſorder? Was the ſcalp ſo mangled by the ſharp and irregular ſtones among which this man had fallen; was it perforated in ſo many places by theſe irregular wounds I have mentioned, as to deſtroy its texture, and make it no longer capable of maintaining

its connection with the ſcull? Or, was the bone itſelf ſo much injured in its internal ſtructure and circulation as to be incapable of puſhing out granulations to meet thoſe of the ſcalp? Does not the practice here purſued, of holding the ſcalp in its place, of ſupporting partial adheſions, and endeavouring to extend them by uſing compreſſes, and confining the inflamed ſcalp in contact with the diſeaſed bone, tend rather to increaſe that inflammation, and indeed to widen the ſeparation? Were not thoſe ſymptoms of ſhiverings and languor which (ſlight though they be) indicate ſuppuration of the brain, too long neglected? Should I not, in place of making ſucceſſive openings, when new abſceſſes were generated, have thrown down the ſcalp to examine the bone? Should I not, according to the ſtrict rules of good ſenſe and good ſurgery, have proceeded to trepan a ſcull, carious to ſuch extent, unequivocally dead, quite incapable of maintaining any connection with the dura mater, ſure, on the contrary, to operate upon it as a foreign body, and to produce ſuppuration? For this was not one of thoſe circumſcribed and ſuperficial exfoliations, which can be thrown off without danger to the brain. Finally, ſince this patient ſurvived ſo horrible an injury for three weeks, and died by a ſort of accident, is not the long delay of this fatal ſuppuration a ſort of proof, that it happened not from primary ſeparation of the dura mater detached by the ſhock, nor by a ſecondary ſeparation depending on ſlow diſeaſe of the bone, but from this deſtruction of the ſcalp, followed in ſucceſſion by death of the ſcull, and ſuppuration of the dura mater, the internal perioſteum of the ſcull?

Though I regard every fatal cauſe as an occaſion of reflection, and almoſt of ſelf-reproach, yet I am ſenſible that this caſe was too complex not to admit of many apologies: There are in ſuch caſes of lacerated ſcalp certain irregularities and anomalies which incline me at all times to proceed with caution. There are conditions of the individual ſyſtems, and varieties of climate, or air, which, without any local cauſe, without the ſcalp or the ſcull being eſſentially ruined in their texture, prevent their re-union, and even occaſion death. The air of particular countries has been remarked through ages as peculiarly noxious to thoſe wounded in the head. Luſitani has celebrated "the noxious air of Florence and Bologna, while the air of Raguſa, ſeated upon a rock, is ſo extremely favourable, that even where the cranial bones are fractured and deſtroyed, hardly any patient dies, but all recover *"

* Florentiæ et Baroniæ ita capitis vulnera periculoſa ſunt, ut raro capite vulneratus ſanatur, &c.—*Luſitani*, cur. 100. c. 6.

In Africa, the climate was ſo ſevere upon the French army in their celebrated expedition under Charles V. the days were ſo hot, and the nights ſo moiſt and cold, that they were in the greateſt danger of being all cut off by fluxes, fevers, and ill-conditioned wounds. "Wounds in the head was very perilous in that place, ſo that if a hundred were hurt in the head, it was not poſſible to ſave ten; for the day was ſo hot that it burned all things, and the night was ſo extremely cold, that it was intolerable, and not to be edited, and ſo by this diſtemperance, when the cranium was uncovered, that the air might touch it, preſently they died without any help. Then I ſeeing that, began to conſider of the matter, deſiring to find ſome means to help them, and ſo ſtudying, it came into my memory, that the air was the cauſe of their death, as it was in truth. Then preſently I commanded all the ſurgeons that were under my juriſdiction, that they ſhould not meddle with any wound in the head without my preſence, which thing was done; and as many as were wounded, the firſt thing I did, inſtead of cutting or lancing, or diſcovering, according to the common order, I joined the parts! and ſewed them cloſe! and dreſſed them upon the wound with our quinteſſence, and with balſams, and with magno liquore, and in a ſhort time the moſt part were helped, and there died none ſo deſperate as before, *and, therefore*, (ſays Phioravanti, the author of this encomium upon his own practice), *in my judgement this was a good invention* *." Nor will any modern reader diſpute that it was, ſince, in place of the ſcholaſtic methods of incarning, exfoliating, and cicatrizing, Fiorovanti replaced the ſcalp, ſewed the wound, and dreſſed it cloſe with that admirable balſam, to the virtues of which he ſo proudly aſcribes his ſucceſs.

The air of a country changes from time to time, "ſo that now," ſays Donatus, "in our town of Mantua, four or five years have paſſed in which the air has been ſo malignant, that the ſlighteſt injury of the head has been fatal; but from the third year this tendency of the air (influxus cœli) began to decline, ſo that now ſuch wounds are without danger, and no one dies †."

The ill air of an hoſpital is more fatal to the re-union of the ſcalp, than either the bruiſing of the ſcalp, or the injury or contuſion of the bone. The air of the hoſpital, the Hotel-Dieu, in Paris, is more noxious than the climate of Cremona, Flo-

* This is the Phioravanti whoſe hiſtory and practices are mentioned in the Firſt Volume.

† M. Donatus de Variolis, cap. ii.

rence, or Mantua, and has been a matter of regret in all ages. The good old ſurgeon, Saviard, ſhows us what danger there is in making even the ſlighteſt inciſions, by a caſe inſtructive in many reſpects.

" Nurſe Bernard of the Hotel-Dieu, no more than twenty-three years of age, was ſtruck on the back of the head by the falling of a poll, ſet up for drying cloaths, and fell ſenſeleſs to the ground. Upon giving her a little eau de vie, ſhe revived, when there was obſerved upon the injured part a ſmall bump only, of the ſize of a nut, and without any wound.

" The ſame evening ſhe vomited, and was oppreſſed at intervals with a degree of ſtupor, which having continued during four days, we became anxious, (ſays Saviard), and reſolved to open the tumor, which was full of coagulated blood, the pericranium adhering ſoundly to the ſcull beneath. From this time forward ſhe had irregular ſhiverings, which laſted at each return four hours uninterruptedly; and during the ſeventeen days in which they continued, we reckoned twenty-five returns. Bleeding we were ſo little ſparing off, that in the firſt days of her illneſs we bled her no leſs than fourteen times in the arm, and once in the ankle; her vomiting continuing inceſſantly, accompanied with pungent pain in the region of the liver.

" After the ſeventeenth day, gangrene came upon the wound, which forced us to make repeated inciſions; bad ſymptoms continued, notwithſtanding, for forty days, and two months and a fortnight had expired before the wound cloſed. Nor did her ſickneſs end here, for ſhortly after the cloſing of the wound, her face was puffed up with an œdematous ſwelling, much ſerum running continually by the ears and noſtrils for fifteen days; deafneſs ſupervened, with lancing pains, and continued diſorder of the head; more than a pint of reddiſh matter flowed from the noſe, and a rheum inundated the cheſt, and threatened ſuffocation to ſuch a degree, that for a long while we looked for nothing but ſudden death. It were impoſſible to enumerate (beſides the twenty-ſix bleedings) the various medicines ſhe uſed; it was by the frequent uſe of aſs's milk that her health was at laſt reſtored. Her pains in the head continued for two years, with beating of the temples, which increaſed with every change of the weather."

" None but thoſe (ſays Saviard *) who have experienced the malignant influence of the Hotel-Dieu of Paris, (inconteſtibly the moſt crowded hoſpital in Europe), can

* Ceux qui n'ont pas l'experience des impreſſions facheuſes qu'un auſſi mauvais air que celui de l'Hotel-Dieu de Paris, qui eſt ſans contredit l'endroit de l'Europe ou il y a en tout temps un plus grand nombres des malades,

imagine the ill effects it has upon the conſtitutions of wounded patients, cauſing even the ſlighteſt wounds to become mortal. Thoſe who have never ſerved in this hoſpital will no doubt wonder that a ſlight contuſion like this, in which the bone was in no degree laid bare, ſhould be followed by ſuch a train of ſymptoms, while thoſe who have, will be little ſurpriſed with a ſcene they have witneſſed continually."

This hoſpital, mentioned in all periods as a moſt foul and peſtilential congregation of vapours, is now reformed; Saviard, the oldeſt ſurgeon of this hoſpital, whoſe works are come down to us, thus warns thoſe who may ſucceed him in his office. Parée, ſtill more impreſſed with the ſame danger, and ſtruck with the ill ſucceſs of thoſe operations, propoſed that an hoſpital ſhould be erected in the ſuburbs, in a more healthy air, for the reception of thoſe wounded in the head. La Motte ſpeaks with compunction and penitence of the bad leſſons he had learnt in the Hotel-Dieu, and of the ill ſucceſs proceeding from the malignant air. Petit complained of the mortality in his time, and Deſſault, the laſt ſurgeon of that hoſpital, found himſelf ſo unſucceſsful, that he renounced at laſt all thoughts of operating in fractures of the ſcull, and, with a few ordinary precautions and remedies, abandoned every ſuch caſe to nature.

Without having the misfortune to have ſerved in any hoſpital, where, to uſe the language of Saviard, "I ſaw innumerable victims," or, being driven to abſolute deſpair, like Deſſault, and abandoning all hopes of being uſeful in wounds of the head; I have yet learnt a degree of caution, with which I would fain impreſs you in your firſt conceptions; for of all the abuſes of practice, the moſt grievous to one who reflects ſoberly and modeſtly on what art can do, is the confident and preſumptuous hope which young men are too apt to indulge, of re-uniting every piece of lacerated ſcalp by the main force of ſutures, and relieving every ſymptom of oppreſſion, or ſlight delirium, or temporary fever, by trepanning the ſcull. I have often obſerved, that though the ſeaſon ſeemed favourable, the heat moderate, and the air of an hoſpital untainted; while other patients, and leſs important wounds, were recovering a-pace, and no ſign of infection could be perceived, thoſe wounded in the

peut faire ſur le corps des bleſſés pour rendre lesmoind res bleſſures mortelles, ſeront ſans doute ſurpris, qu'un ſimple contuſion à la tete, en laquelle l'os du crane n'a jamais etè decouvert, ait eſt ſuivée d'un ſi longue ſuite d'accidens; au lieu que tous ceux qui travaillent dans cet hopital n'en ſont point ettonez, etant ſans ceſſe les temoins des effets funeſtes de cet air pernicieux, et trops ſouvent meme du nombre des victimes expoſées à ſes inſultes à leur propre dèpens, &c.

ſcalp became, after a few days confinement, languid, feveriſh, and oppreſſed, and had every uſual ſymptom of an oppreſſed brain. Not to ſpecify innumerable caſes, from which my general obſervation is deduced, I have ſeen a boy whoſe ſcalp was lacerated ſo very largely, as to ſhew the ſcull naked, but uninjured, continue well, and free from fever or delirium ſeveral days, then ſeized with vomiting, like that of oppreſſed brain, with rigors and foul tongue, and rapid pulſe, and delirium. I have ſeen a boy lying in this doubtful and dangerous ſtate for fifteen days, the ſuppuration of the wound being interrupted, and its complexion as much affected as the general health; exhauſted by ſucceſſive paroxyſms of fever, and yet in no imminent danger. I have ſeen three ſoldiers hurt, in the confuſion of a fire, from bricks or beams falling on them, all the three wounded in the head, all ſeized at once with the ſame temporary fever and delirium, and yet not one of them in any kind of danger. I have often ſeen, in an aged perſon, where the ſcull was laid bare by a blow, the integuments ſlough entirely away, and fall off in cakes as black (to uſe the expreſſion of nurſes) as the ſoot on the pot, and, after an interval of imminent danger, in which even the outer plate of the ſcull has exfoliated, I have ſeen with admiration the ſcull puſh forth its granulations with ſuch vigour in extreme old age, (at ſeventy-five years of age), as to replace the ſcalp with a broad and firm cicatrix. Theſe accidents of fractured ſcull, or lacerated ſcalp, are frequent only in an hoſpital; and you will often obſerve your patient, whatever his age or conſtitution, attacked with ſickneſs and fever, which ſeems to imply danger, but which is to be cured by antimonials, opiates, and the warm bath. You will have the goodneſs, then, to believe, that this is no inſignificant vindication of my own conduct in an unfortunate caſe, but an independent, a neceſſary and a uſeful injunction to you: "Never permit yourſelves to be alarmed too much at theſe firſt ſymptoms of fever, nor hurried into any precipitate ſtep, for many have narrowly eſcaped the knife and the ſaw, the ſcalping proceſs, and the uſeleſs perforation of the ſcull, to whom, during the continuance of ſuch a temporary fever, the ſlighteſt of theſe operations would ſurely prove fatal *."

* I think it of ſo much importance to the young ſurgeon, to have theſe prudent maxims thoroughly eſtabliſhed in his mind, that I would rather err on the ſafer ſide, and ſhall tranſcribe one caſe from my books. The ſlow progreſs of the ſymptoms of ſuppurated brain has always ſtruck me as peculiarly intereſting, and the critical ſituation of the boy Tom Scott, which I am now to deſcribe, attracted my attention. "This was a fine boy of thirteen years of age, who having, on new-year's day, got into an empty hamper which was in a cart, the horſe running off, the hamper was canted out of the cart, and the boy toſſed like a cat out of a baſket. His

That aphoriſm of Hippocrates, which relates to the fever of intoxication, may be transferred, without reſerve, to that accompanying wounds of the head. "If a man be ſo intoxicated, as to lie ſpeechleſs, and he be ſeized with fever, he is in no danger; but if not ſeized with fever, he dies the third day *." We may, with much greater truth, pronounce the patient ſafe, who, having a wound of the head

fall was, of courſe, from a conſiderable height, and his head lighted among broken bottles. A woman came out, took him in her arms, and carried him up ſtairs; waſhed his clotted hair, and took a very motherly care of him, till Mr Cheine, junior, of Leith, came, and ſewed a conſiderable wound of the ſcalp.

"But from this time he was ſadly neglected, being ſent to the hoſpital, where I ſaw him firſt on the twentieth day. On the eighth day, probably on account of ulceration of the ſcalp, the ſtitches had been cut out, and the wound thrown open; the cut, arching in a ſemicircular form over the parietal bone, was in a ſtate of ulceration. The bone was bare in its upper part, and rough, and apparently carious to a great extent. Where the bone ſeemed ſoundeſt, it was covered with that fine down of granulations which ſprings from the ſurfac of a denuded bone, and which is eaſily puſhed off with the probe. The edges of the wound of the integuments was bordered with the ſame flat and gloſſy granulation. The ſcalp from the place of the cut, (which paſſed in an arched form over the top of the head), was quite down to the ear, in a ſtate of complete ſuppuration. The fluctuation of matter was every where manifeſt; the ſcalp in many places as thin as parchment; the redneſs of internal ulceration, threatening to burſt outwardly, was remarkable in many places. The greateſt bag of ſuppuration was immediately around the ear, and an opening was made with a bleeding lancet juſt before the ear, by the ſide of the temporal artery, from which a profuſion of pus was diſcharged; a ſecond opening behind the ear was alſo neceſſary.

"With ſuch an extent of ſuppurating ſcalp and carious bone, the boy's condition ſeemed of itſelf extremely critical. But the fever and ſickneſs had riſen, at the ſame time, to an unuſual height; I found him, on the twenty-firſt, after theſe very neceſſary openings, with a furred tongue, a rapid pulſe, beating more than 120 in the minute; his ſkin parched, his thirſt very great; the face not flushed, but the eye heavy and oppreſſed, and the pupil, (though in this I may have been miſtaken, as he had a very large black eye), ſomewhat dilated; his motions were peculiarly languid, and he laid his head, during the dreſſing, very oppreſſed like, on his nurſe's ſhoulder. During the night he ſeemed ſlightly delirious, and at one time ſcreamed out very violently, having taken a great alarm at the noiſe of coals being brought into the room. When ſlumbering, he mutters; when firſt rouſed, he talks incoherently; when held up for dreſſing, and eſpecially when tormented by the probings and inciſions, his feelings and ſenſes are acute, and his remonſtrances and entreaties very ſenſible.

"His ſituation was, in every reſpect, critical and intereſting. It is not difficult for one who has been attentive to practice, to diſtinguiſh the oppreſſion and languor of fever from the ſtupor and nervous affections of an ulcerating brain. I ſaw ſomething in this boy's condition, which inclined me to treat his illneſs as a ſymptomatic fever, and I hold this caſe to be no bad illuſtration of the remarkable aphoriſm above quoted, and of the application of it to injuries of the head; for ſtupor accompanied with fever is void of danger, a ſlighter ſickneſs and oppreſſion, with more of nervous feelings, would have been to me much more alarming.

"I treated this as a ſymptomatic fever, with antimonials, opiates, fomentations; preſſed out the matter gently; dreſſed the head lightly and carefully; the integuments ſubſided, and adhered; the bone granulated, and united

* "Si quis, ex ebrietate, voce privetur, et ſtatim ſane ipſum etiam febris corripiat ſanus ſit; ſi vero non corripuerit die tertia moritur." *Hippocr.*

has his delirium and vomiting explained by concomitant fever; while he who has ſlighteſt ſhiverings, a leſs perceptible oppreſſion, and no concomitant fever, is in a doubtful ſtate.

Two inferences, I believe, are now plainly eſtabliſhed. *1ſt*, That the ſcalp, though lacerated and ingrained with ſoil or ſand, will re-unite, in favourable circumſtances, with the ſcull, as with any ſoft part. *2dly*, That the circulation from the pericranium to the ſcull is ſo eſſential to its ſound and healthy condition, that often its violent ſeparation affects the whole circulating ſyſtem of the bone, occaſions its death, and endangers the brain.

That the mere ſeparation of the pericranium will effectually deſtroy the ſcull, is but too well proved by the practices of the older ſurgeons *. " Joannes Gometius de

with the edges of the wound. The various leſſer abſceſſes were conſolidated, and I had the pleaſure to find that I had calculated rightly; that this boy was ill only of the ſymptomatic fever of ulcerated ſcalp, and was, by prudent meaſures, ſaved from the knife and the ſaw. But, had a conſultation been called, he would have been trepanned; had he been trepanned, he muſt have periſhed. But more of this in a future diſcourſe.

* Quantum ſimplicibus capitis vulneribus, *in quibus cranium læſum non ſit*, loci ad aperiendum conſuetudo vulgata, contra id quod præcipimus, tum nocumenti, tum moræ ad ſanandum afferre poſſit, præter alia multa exempla, unum illud ſatis confirmat, quod in Joanne Gometio de Columbis Cazzallenſi editum eſt, qui Philippi Regis noſtri ſtipendiis terras monteſque mineralium inveſtigandi cauſa rimatur: is, dum alte defoſſo ſpecu una cum operario inquiſitioni ſuæ operam daret, ad conſpectam repente glebam, quæ meralli ſpecimen habere videbatur, manu tollendam ſeſe feſtinus demittit, quem focius imprudens librato jam atque improviſo ictu ligonis, altero dente oblique, ac non graviter percuſſit in dextra capitis parte, ſuper os quod laterale dicitur; nec vero vulnus ad cranium pertigit, neque ullam rupti oſſis ſignificationem dedit, quoniam revera os minime fuerat læſum. Huic imperitus chirurgus, vulnus adaperiens, vehementer auxit, crucemque tribus digitis quadratam incidit, et cranium ſatis pro arbitrio detexit; deinde multos dies digeſtivis, et oleo uſus eſt, adeo profuſe, ut ultra quindecim regios nummos oleo, et ovis adhibendis impendiſſe dictus ſit; ex quo evenit, ut non modo detecta cranii pars, ſed multo etiam major undique portio corrupta fuerit; tandem poſt alterum jam menſem, cum ego a D. Franciſco Mendocio, qui regis mandato metallorum rationibus et operibus curæque omni præerat, accerſitus, hominem vidiſſem, Llerenam, ubi publico ſtipendio medicam artem exercebam, adduci juſſi. Huic, cum ſatis magnam oſſis partem extrahere opus eſſet, quæ tamen anguſtiori vulneris apertione produci non poſſet, cumque ego tantumdem aperire recuſarem, orificium ad argentei nummi, quem regium vocant, magnitudinem trepanis feci, ita ut membranæ extarent, atque ea parte pus, quod intus corruptum erat, quodque in dies conficiebatur, purgari poſſet; atque ita balſamo illo a me deſcripto, et emplaſtro gummi elemii, et filis tam diu curationem proſecutus ſum, quoad inſtrumentis leviter quotidie expertus os ipſum circumquaque abſciſſum eſſe, et duram matrem ſuperinducta jam carne conſtare intellexi. Igitur ut os ipſum magnum minori multo foramine extraherem, inſtrumentum mihi ad trepani inſtar comparavi, quo foramen facerem, quantum ferreus fuſus fæminarum noſtratium facere poſſit; quo ferro contiguis ferri pertuſionibus in crucis modum os totum corruptum perforavi; opus autem ipſum a medio loco inceperam, qua ſuperius vulneris ipſius oſculum patebat, quod ad argentei nummi magnitudinem paraveram. Foraminum vero intercapedinem, levatore dicto inſtrumento interrupi; facile enim os ipſum

Columbis of Cazzalla was appointed by Philip, King of Spain, to ſearch for precious metals and mines. While employed with one of his miners in digging a cavern, he ſtooped to pick up what he imagined to be a lump of ore; and the workman, having his ſhovel at that moment lifted, and in the act of ſtriking, hit him obliquely, and rather ſlightly, upon the right parietal bone; but the wound did not penetrate to the bone; there were not the ſlighteſt ſign of fracture; the ſcull, indeed, was unhurt. A rude and unſkilful ſurgeon enlarged the wound by crucial inciſions of four inches long, laid bare a great portion of the ſcull, and dreſſed it with oils, and digeſtive ointments, and turpentines, and waſted an incredible quantity of eggs and oil, for which he charged fifteen crowns; by which art and ſkill, the ſcull became completely carious, not only where it was laid bare, but to a great extent.

" A month after, I was called, in the courſe of my public duty, (for I was a ſalaried ſurgeon), by Franciſco Mendocio, maſter of the mines, to viſit this perſon. I found reaſon to remove a large portion of the corrupted bone, for which there was no adequate opening: I therefore made, with trepans, an opening, the ſize of a crown, ſo as to expoſe the membranes, and allow the pus already collected, and that which was daily formed, to eſcape, and, by dreſſing daily with the proper balſams and plaſters, I ſucceeded at laſt in inſulating and ſeparating the corrupted bone, when the dura mater appeared covered with granulations. But there remained much corrupted bone to be extracted through a comparatively ſmall opening. I ordered an inſtrument to be forged, a ſort of trepan, calculated to make an opening equal in ſize to that of our women's ſpindles; and having with it

rumpenti cedebat. Hæc ubi jam expedieram, unam primum ex his quatuor portionibus inſtrumento attollens extraxi, et alteram deinde, et tertiam; quartam, quæ maxima erat, in poſterum diem reliqui, quam tandem extraxi. Totum autem os laterale appellatum, et petroſi etiam ejuſdem lateris bona pars, et coronalis quoque non exigua portio, quæ in anteriorem partem vergit, extracta eſt; ex petroſo prodit quantum fere ad auriculum originem extenditur. His autem oſſibus extractis, dura mater, quæ jam interim inducere carnem cœperat, ultra modum etiam induxit, adeo ut exuperantem carnem ex orificio illo, quod jampridem feceram, bis fuerim coactus reſcindere; adeo autem duram experiebar, ut forcipibus vix poſſem reſcindere. Poſt hæc autem cum melius habere ſtatim cœpiſſet, Cazzallam diſceſſit, a quo poſt menſem fere accerſitus ſum, quod in capite ſuper occipitis ipſius os magnum tumorem ac pure etiam plenum haberet; quem cum aperuiſſem, oſſa multo etiam magis, quam quæ predicta ſunt, corrupta eſſe deprehendi; tum vero Llerenam ad me venire juſſu, poſtera die ſatis ex arte ſubtiliter oſſa extraxi, tria etiam prædictis æqualia, ſed multo magis corrupta. Relictus autem eſt toto fere occipitis oſſe carens, atque portione etiam non exigua alterius lateris oſſis ſiniſtri, vulnera autem ipſa carne et cute undiquaque obducta ſunt; molli tamen et tactui cedente conſtitutione, quæ paulatim dureſcit. Homo autem ipſe divino beneficio liberatus bene habet.—*Arcæus de Curand. Vuln.* lib. 2.

made two direct and crucial lines of contiguous perforation acroſs the centre of the corrupted bone, and beginning my work of burſting up the carious parts at that central opening which I had already made, I broke bridges betwixt the perforations, the corrupted bones giving way eaſily before the force of the levator, and, having raiſed and removed ſucceſſively the firſt, ſecond, and third quadratures of this carious circle, I left the fourth, the largeſt portion, to be ſeparated on the following day; and thus I ſeparated the whole of the parietal, much of the frontal, and all that part of the temporal bone which lies above the ear.

"Now, the dura mater, which had already begun to puſh forth its granulations, ſhot out ſo powerfully from all that circle which was oppoſite to the firſt central opening, that I was twice obliged to ſhave it off.

"When my patient began to recover, he returned to Cazzalla, where I was ſoon called again to viſit him, on account of a large ſuppurating tumor of the occiput, covering the occipital bone; which being opened, I found this bone more thoroughly corrupted than any of the others. I carried him once more home with me, and carefully extracted theſe portions of bone, equal in extent to the former, but far more corrupted. Thus, after the former loſs of bone from the right-ſide of the cranium, almoſt the whole of the occipital bone, and a part even of the left parietal, were pulled away, yet the man recovered, the place of the caries being covered over with ſkin and cuticle, but thin, ſoft, and yielding."

When at any time I have ſeen large portions of the cranium thus carious, and ſeparating without injury to the brain, I have inferred that the ſcull was killed, merely from being deprived of its pericranium: when an old and drunken creature, for example, has fallen into the fire in a fit of intoxication, and the integuments have ſloughed, and the parietal bone exfoliated, of which I have ſeen repeated examples, the fact is plainly proved; but when, as in the following, the caries proceeds from a blow, we muſt remain in doubt whether ſuch blow had merely injured the integuments, or affected the bone.

"A woman about forty-five years of age, whoſe convivial talents I was not at firſt aware of, came under my particular care, with a large wound on the ſide of the head, about which ſhe told an incredible tale, ſaying ſhe had been robbed, though ſhe was pennyleſs, and that too in a place where no robbery ever had been committed. She ſaid, that after having been felled with a bludgeon, ſhe was left weltering in her blood; whereas, I am perſuaded, the blow ſhe had received ſhe deſerved too well to think of diſcloſing to us when or how ſhe got it. The

blow had been ſtruck obliquely, ſo as to lay bare a conſiderable portion of the ſcull; and in a few days I could perceive, upon putting my finger upon the ſcalp, that it was detached to a great extent. The integuments were thin and puffy, undermined with ſuppuration, and incapable of adhering to the bone, which, though naked, ſeemed to be ſound and freſh. The woman was hale and ſtout, had never an hour of ſickneſs, nor a reſtleſs night. She ſpoke, ate, ſat up, and at laſt was able to be half the day out of bed. Yet, from the ſtate of the bone, I believed her to be in the moſt imminent danger, for it became daily more and more diſcoloured, was yellow on all its expoſed ſurface, black on ſome points, and thoroughly rough and ſcabrous, and by the eighth or tenth day, I could plainly trace with the probe that deep rutt which defines the boundaries of a carious bone, and which formed ſo decided a line, and circumſcribed the caries ſo definitely, that in this, as in Sharp's caſe, it might have been miſtaken for a fracture.

"Aware of her doubtful condition, I requeſted the young gentlemen to watch her with particular care, and give me the earlieſt notice of any ſigns of danger; to report to me the ſlighteſt headach, or ſickneſs, or even a reſtleſs and perturbed night. At laſt ſhe was ſeized with ſymptoms of a very doubtful import, with languor, ſlight ſickneſs, a corded feeling in the forehead, and a violent cough; but ſtill I ventured to take this high reſponſibility upon myſelf, and defer calling a conſultation, leſt we ſhould be hurried into ſome precipitate ſtep. I now plainly ſaw, that matter began to ooze out by the edges of the carious circle, and was ſenſible that the carious bone muſt exfoliate; but while ſhe retained her health, was able to ſit up in bed, had no ſhiverings, nor the ſlighteſt fever, I felt conſcious that I was not entitled to perforate the ſcull, nor even propoſe the queſtion, and was ſure that I could not, without perforating, move the carious bone.

"While I waited in fear of worſe and fatal ſymptoms, yet in hopes of a ſpontaneous ſuppuration, ſhe was one afternoon ſeized with a paroxyſm of her habitual cough, ſo violent, that ſhe thought her head would rend aſunder; at laſt ſhe felt, from the violence of coughing, a ſudden ſenſe of burſting within her head: the feeling of ſomething having given way was ſo diſtinct, that ſhe believed (though ſhe could not imagine how ſuch an accident could happen) that her cap was torn, and ſhe took it off to examine it; when putting up her hand to the ſore, ſhe found it ſtreaming with blood, which continued to run down her cheek. That evening, her headach entirely ceaſed, ſhe had no more of the corded feeling; and, next morning, upon

preſſing with the probe at that ſide of the carious bone where the matter ſeemed to iſſue through a fiſſure, the whole to the extent of four inches, a piece the ſize of the palm moved eaſily with the ſlighteſt preſſure of the probe. From day to day it moved more eaſily; at laſt I diſengaged and extracted it without the ſlighteſt violence, and the little blood that flowed was rather from the tender granulations of the bone itſelf. The exfoliated part, conſiſting of both tables of the ſcull, was nearly four inches long; it had the irregular and indented appearance of a piece, a map paſted on board, and divided into ſhires and counties for the inſtruction of boys, and had not the ſlighteſt appearance of fracture *. As the integuments covering the carious bone were carefully preſerved, and the dura mater was in a ſtate of perfect granulation, thoſe ſurfaces adhered, and ſhe was ſpeedily and perfectly cured, and did not fail, when no longer dependent on me for medical aſſiſtance, to perſecute me with petitions for another ſort of aſſiſtance in her tipſy moods; often I ſaw her, after her cure, outrageouſly drunk, but never ſick; for theſe are a kind of people to whom, as the Scotch proverb ſays, "God is good."

Thus we have every reaſon to believe, that the mere ſeparation of the ſcalp will injure the ſcull; and the ſcull, injured thus by the death or ſeparation of its perioſteum, may corrupt ſo ſlowly, as to do no harm to the dura mater, nor endanger the brain, but terminate in harmleſs exfoliation. How elſe could we account for patients ſurviving the rude dreſſings of the older ſurgeons, the cauteriſing, and the ſcraping with exfoliating irons, till the cranium was thoroughly deſtroyed. This caſe affords a moſt important leſſon to the young ſurgeon; for, had the bone continued firm, the headachs increaſed, and the brain inflamed, I ſhould have been conſcious of having occaſioned the patient's death; and, ſince the ſeparation of the bone was a ſort of accident, and the conſequence of its not ſeparating would have been certainly fatal, I am almoſt inclined (however ſucceſsful) to condemn my own practice.

The great hoſpital, the Hotel-Dieu, affords us examples of the moſt barbarous and unſucceſsful practice, and (among the numbers whoſe conſtitution and natural ſtrength were contending with diſeaſe) we meet with with the moſt extraordinary cures, exfoliations, not of pieces of the cranium, but of the whole of it! the dura mater uniting ſoundly with whatever integuments remain, and the brain continuing in perfect health.

* This piece of bone is drawn in my general plate of the ſcull, lying on the board, near one of the ſculls, and is marked with the number of this page, 372.

" A poor unfortunate creature was diſmiſſed, in October 1688, from the Hotel-Dieu, after two years illneſs, in conſequence of a fall while in a ſtate of intoxication. The upper part of the frontal, the whole of the parietal, and a great part of the occipital bone, having been expoſed during the proceſs of the cure *, exfoliated in their whole thickneſs, and were thrown off; ſo that this great exfoliation reſembled the ſcull-cap ſawn off in diſſection. Many who were incredulous gave her money to ſhow her head, which ſhe kept always covered with a calibaſh, or gourd-ſhell. The pulſations of the brain were diſtinctly ſeen through the thin pellicle which covered it, and which was frequently ſtudded with ſmall veſicles, containing a reddiſh ſerum, terminating uſually in little ulcers, which, together with her tippling practices, ſo protracted the cure, that at the end of three years the ſcalp was not entirely whole.

" The fact ſeemed ſo incredible, that often the audience, after Mr Davenry had ſhewn the bones, and related the caſe, came to me to be aſſured, whether I had indeed taken thoſe bones from the head of a patient, and whether ſhe ſurvived †."

But that a wound of the integuments, naturally ſlight, and void of danger, may, by ſuch miſconduct, cauſe not merely caries of the bone, but ſuppuration of the brain, the following incident will prove to you. " A young man of ſeventeen years of age, was ſtruck in play, by one of his companions, with a ſmall ſtone on the left-ſide of the head, over the parietal bone. He put himſelf into the hands of a ſort of ſurgeon, who dreſſed this ſlight wound with a heavy hand, cramming it ſo with rough lint, that the ſore rankled and inflamed, with a daily waſting of the integuments. Yet the boy was well in all other reſpects, went daily to market, and ſerved his maſter with his uſual alacrity. I ſaw this ſlight cutaneous wound at the time of his firſt committing himſelf to the hands of the barber, with whom I at the time remonſtrated concerning his coarſe manner of dreſſing the wound; but he replied, " That it was the duty of a ſurgeon to be cruel, and not faint hearted." It was becauſe the wound ſeemed ſo very ſlight, that I gave up attending the lad, but on the eighteenth day, he came to me of his own accord, deſiring me to ſee how things went on. I found all the ſurrounding integuments fiſtulous, down to the bone, and there was one great abſceſs, full of putrid matter, which could not be emptied but by preſſure of the hand. I, of courſe, adviſed that this abſceſs ſhould be opened at its lower part, which the ſurgeon promiſed to do.

* " S' etant decouverts dans la ſuite du traitment."

† Saviard, p. 388.

" At this time I had no fixed quarters, but was obliged to follow the royal army, ſo that I was prevented from ſeeing the patient for ſome time; but, about the twenty-fifth day, I was called to him, and his friends mentioned to me, that the fever which I found him in had continued four days. His eyes were heavy and ſwelled; he was in a ſort of ſtupor, and was reduced to extreme weakneſs. The ſinus was ſtill unopened, and contained very fætid pus; for this blockhead of a barber had, either through pride or fear, altogether neglected what I adviſed.

" I had now no reaſon to doubt that the brain was affected, and propoſed that the integuments ſhould be laid open, and the bone perforated, thinking a doubtful remedy preferable to certain death. But, the preſumptuous fool, when he heard that I had propoſed to perforate the ſcull, proteſted, " That if it were not for the fever, or if the fever ſhould ceaſe, he could make the cure of the wound a very eaſy matter."

" On the twenty-ſixth day, this young man expired; I requeſted that his body might be opened, and the empyric conſented with all poſſible alacrity, aſſured in imagination that his patient's death proceeded merely from fever, not from any injury of the head; and in this preſumption he was hardened by recollecting, that from the firſt there was no ſign nor appearance of any injury to the bone.

" Upon opening the head, the cranium was, indeed, found free from fracture; but there was found betwixt the ſcull and dura mater a conſiderable quantity of matter, the brain being at that place ſuppurated, and melted into pus *."

Thus are we aſſured, that the mere detachment of the ſcalp (if it continue detached) will deſtroy the ſcull, and endanger the brain; for, though it has (in the dura mater, and in its own ſtructure) various ſources of nouriſhment, though it is little injured by a temporary or partial privation of blood, yet the permanent ſeparation of the pericranium manifeſtly kills the ſcull through its whole thickneſs. In the older times, when the doctrine of exfoliation prevailed,—when they were in the practice of cutting off the ſcalp, ſo as to occaſion the death of the ſcull,—when the ſeparation of the dead part was miſtaken for an eſſential proceſs in the cure, it was reckoned the indiſputed duty of the ſurgeon to procure exfoliation in every wound of the ſcalp; and he attained his end, both by holding off the ſcalp from the ſcull, and ſo preventing its re-union, and by ſcraping and cauteriſing the bone.

In modern ſurgery, nothing is to be ſeen at all correſponding with this;—the ſcalp is never, by any accident, kept ſeparate from the ſcull, unleſs it be by an ef-

* Botallus, p. 736.

fuſion of blood under the pericranium. There are no circumſtances in which the ſcalp is more effectually ſeparated from the ſcull, than in ſuch extravaſations, and none more dangerous to the bone; for, however violent the ſeparation of the ſcalp in caſes of laceration, there is in a few days a healthy flap of ſkin, and a grannulating bone ready to unite together, aided by all appliances and means to boot, on the part of the ſurgeon. But, in the caſe of bloody effuſion, there is, in place of the contact of ſurfaces, always a fluid, always a foreign body interpoſed, thence the ſcull is as naked as if expoſed to the outward air. The ſurgeon, unwilling to open a tumor which he has often ſeen diſappear ſpontaneouſly, lingers, and is irreſolute, and when he at laſt is forced to open it, is conſcious, as ſoon as the blood is evacuated, that the bone is carious, and in part abſorbed, and that he ſees diſtinctly the pulſations of the brain.

Children are often born with tumors, produced by the preſſure of the bones of the pelvis upon the prominent centre of the parietal bone, or by the preſſure, in the courſe of the dilatation, of the orifice of the womb, eſpecially in a firſt labour, and in a woman advanced in years. Yet theſe effuſions of blood do not always corrupt the bone, but uſually diſappear in a few days.

Very frequently careleſs nurſes, or idle mothers, leave their little children aſleep on a high bed, and when they awake, and begin to toſs and cry, they, if not immediately attended to, fall out of bed, head foremoſt. I have very frequently been called to children who have fallen thus from the careleſſneſs of nurſes, and often the fall has been ſo violent, that the mother, juſt before ſhe heard the child's ſcreams, has diſtinctly heard its fall from an adjoining room. I have ſeen the effuſion ſo great, as to raiſe a tumor which you could hardly cover with the palm of the hand, and apparently containing three ounces of extravaſated blood; the child meanwhile lying in a ſtate of ſtupor. Yet, the ſtupor is merely from the child having fatigued itſelf with crying, and ſuch tumors uſually diſappear. Many as I have ſeen, I do not remember one which required to be opened, and remember one only which ulcerated the ſcalp, and burſt, after deſtroying the bone. That child, which I attended, along with Mr Lawſon, ſurgeon, loſt a piece of the parietal bone of conſiderable extent, but did not ſuffer in its health.

More formidable effuſions of blood happen in rambling ſchool-boys; and they are of ſuch a deſcription, as might tempt the inexperienced ſurgeon to open them. Whether from opening ſuch tumors any ill conſequences might reſult, I ſhall not venture to predict, and do not by experience know. But of this I am aſſured, that if left

alone they are generally ſafe; that if the young ſurgeon were to yield to the ſuggeſtions of his own fear, whenever in thoſe caſes he imagined he felt a depreſſion, and were upon this preſumption to cut open the integuments, and trepan the ſcull, the iſſue of his adventure would be very often fatal, and many a boy would be, as ſome have been, "killed by art, for want of art." The deception proceeds from this peculiarity, that where the veſſels ruptured by the fall have made the greateſt effuſion, the blood continues long fluid; and if there be one large artery burſt, and the tumor has a degree of pulſation, it continues always fluid; but, towards the margin of this cavity, where the cellular ſubſtance is not entirely detached from the pericranium, the blood is ſo injected into the cellular ſubſtance, and mixed with its fibres, that the baſis and margin of the tumor are uncommonly firm, and the hardneſs ſuch as actually to reſemble that of bone. From this hard circumference, the ſurface apparently declines towards that part where the cranium is more diſtinctly felt through the fluid blood; and the declivity is ſo diſtinct, and the hardneſs of the margin ſo entirely reſembles that of the centre, where the ſcull is felt unequivocally, that the ſurgeon has not the ſlighteſt doubt that he feels a wide and deep depreſſion of the ſcull; and when along with this the boy lies oppreſſed, and vomiting, he can hardly refrain from opening the tumor, or think himſelf vindicated in leaving the boy without help.

I know no deception which experience ſo effectually corrects as this, of an apparent depreſſion felt through a bloody tumor of the ſcalp; nor can any thing but experience correct it; for to the ſenſe of touch, the depreſſion is ſo palbable, and the boy's danger ſo very obvious, that even an experienced ſurgeon, on any new occaſion of examining ſuch a tumor, is confuſed with the very peculiar feeling of that deception, which he is already aware of. Many times I have been called to rambling boys, who had fallen in climbing walls, or in playing about ſaw-pits, and unfiniſhed buildings; and have often found them with great effuſions of blood over the parietal bone, and apparent depreſſion; the face ghaſtly, and the extremities cold, in a ſtate of inſenſibility, with the eyes not cloſed, but turned upwards, as in the convulſions of children. But, fortunately for me, the caſe of the boy that I firſt ſaw lying in this ſtupor, in the earlieſt part of my practice, was ſo perfectly deciſive, that I have never ſince been in danger of any precipitate ſtep; for this boy, who had fallen from a garden-wall, lay in a ſtate of abſolute ſtupor, and with a degree of convulſion during four days. He vomited inceſſantly, and his extremities were cold, and his face ghaſtly. The appearance of

depreſſion was ſo ſtriking and ſingular, that I made not the ſlighteſt doubt, that if he did recover without any operation, manifeſt marks of depreſſion muſt remain. But he recovered in a few days perfect health and ſpirits, and the appearance of depreſſion vaniſhed, as the blood was abſorbed. In ſhort, theſe effuſions are very general, even when of the largeſt ſize, mere bloody bumps, which, like Squire Richard's, require only vinegar and blue paper.

Three years ago, I viſited, with Mr Cheine, ſurgeon in Leith, a boy whoſe ſituation ſeemed abſolutely deſperate. He had fallen headlong from a corn-loft upon the rudeſt pavement I have ever ſeen, conſiſting of big, poliſhed, and prominent ſtones. The depreſſion ſeemed too obvious to be diſputed. The boy vomited inceſſantly, and lay in a ſtate of ſtupor, unleſs when he cried out in his delirium, for he continued delirious for many days. He often threw himſelf backwards in his mother's arms, reclined his head, and ſtiffened as in a convulſion. Yet this boy was ſpared the cruel and dangerous operation of trepan; recovered with very little aſſiſtance on our part, farther than was merely neceſſary to amuſe the parents; and is now in perfect health.

Thus we are conſcious, that all effuſions of blood are not under the pericranium; that the blood is often effuſed among the layers of the pericranium, muſcular aponeuroſis, and ſkin, in ſhort, of the common cellular ſubſtance, and is abſorbed, without danger to the bone. But when the blood is effuſed under the pericranium, ſeparating from the bone thoſe membranes, and that cellular ſubſtance which ſhould nouriſh it from without, the bone muſt die; not by that peculiar power which has been long aſcribed to blood, of diſſolving bone, but by acting as a foreign body, and ſeparating one natural ſurface from another.

I know not whether any ſpecific and unalterable rule can be propoſed for the treatment of caſes ſo various in their forms, their cauſes, and probable effects, but ſomething I feel inclined to ſay on this ſubject. *Firſt*, Effuſion of blood among the layers of the ſcalp, and pericranium, of whatever form, and with whatever ſymptoms attended, is not to be raſhly touched. The blow, and general ſhock which occaſions this ſuggilation without, is, I am perſuaded, accompanied with a degree of effuſion within. A boy may lie ſtupid from ſuch a ſhock, without danger, and time muſt be allowed for the operation of the natural powers, and the abſorption of the internal effuſion, as well as the diſſipation of the external tumor. But

let it be a rule with you, never even to think of inciſions, nor permit them to be mentioned in your preſence, while the effuſion has the character of mere ſuggilation, or euchymoſis; *i. e.* while the blood is diffuſed among the cellular ſubſtance, with little ſenſe of fluctuation, and that little leſſening every day *. Such are the effuſions in the ſcalps of new-born babes, and children who have had ſlighter falls from the bed, or cradle. *Secondly*, When the tumor aſſumes the proper form of aneuriſm,—when there is a large and circumſcribed tumor, fluid blood in the centre,—a hard baſis, and margin,—a diſtinct pulſation through the whole tumor, and its ſize increaſing from day to day, there is great danger to the ſcull: the tumor ſhould be laid open without delay, and dreſſed with lint; and it will, after two or three days of ſuppuration, (in which the matter will be fætid, from being tainted with the blood), heal kindly; for the arteries of the ſcalp, when thus bruiſed, and pouring out blood, have ſufficient force to maintain, or even to enlarge, the effuſion of blood which cannot be abſorbed, in oppoſition to ſuch a cauſe. Yet, when opened, ſuch arteries do not bleed much, the hemorrhagy is ſuppreſſed merely by applying a bit of lint; they rarely need to be tied. *Thirdly*, Effuſions of blood, though unaccompanied with pulſation, if they continue fluid, and do not gradually ſubſide from the period of the ſixth or ſeventh day, muſt not be regarded as of a ſlight or indifferent nature, and, before the tenth or twelfth day, ſhould be opened †. From all the experience I have had, theſe rules of conduct will be uſeful to you; and while I warn you to refrain in general from opening ſuch tumors, it is alſo my duty to ſtate unequivocally and plainly, that there are others which occaſion caries of the ſcull, where a little imprudence, a little delay, endangers the patient's life.

" Mr Harrold, partner to Mr Wilmer, had a boy brought to him, of fourteen years of age, with a tumor on the crown of the head, the ſize of a hen's egg: It was ſeated on the middle of the ſagittal ſuture: It was occaſioned, as his father related, by a blow, the boy having been ſtruck over the head with the arm of a broken

* Mr Petit ſays, p. 88. " Rien n'eſt ſi commune que le Boſſe a l'occaſion d'un coup a la tete elle n'eſt ſouvent qu'un bagatelle."

† Scultetus ſays, " Mirabili ſucceſſu curatur contuſio capitis mactatorum animalium pellibus, præſertim vero muris et canis, quæ contuſiones dum adhuc calent adhibitæ, et per viginti vel plures horas relictæ egregiæ diſſolvunt."—P. 109. The dog-ſkins, and the mouſe-ſkins, are as harmleſs, but not a bit more efficacious, than Squire Richard's blue paper. It means no more than letting ſuch tumors alone, till the blood be abſorbed.

chair: The ſwelling enſued immediately after the blow. The father had flattered himſelf with hopes of its diſſolving by time, and the ſimple remedies recommended by his neighbours; but about two months after the blow, he brought the boy to Mr Harrold, the tumor undiminiſhed, and containing, according to Mr Harrold's apprehenſion, nothing but blood. As a meaſure of precaution only, and without apprehending the diſorder which had already been produced, he opened the tumor with a long inciſion, and diſcharged a quantity of blood, yet fluid, and not in the ſlighteſt degree grumous nor blackened; and, as the artery from which it had flowed was ſtill open, and a conſiderable hemorrhagy enſued, he dreſſed the cavity haſtily with dry lint.

"On the ſecond day, he removed the external dreſſing; but, not chuſing to riſk a ſecond hemorrhagy, he left the lint which adhered more immediately (and very ſtrongly) to the ſurfaces, untouched: When this alſo was removed at next dreſſing, much ichorous and putrid matter was diſcharged, and, upon looking into the bottom of the cavity, was ſurpriſed to perceive diſtinctly the pulſations of the brain, and that the bone was entirely wanting in all that part which correſponded with the baſis of the tumor, a ſpace of two inches in diameter." The danger of this boy, then, was moſt conſpicuous and imminent; fortunately the dura mater granulated, and the opening healed kindly.

Such are the dangers proceeding from delay, thoſe ariſing from miſconduct are not leſs to be feared.

"A ſchool-boy, having his hair ſeverely pulled in a quarrel, there roſe a ſmall bloody tumor of the ſcalp, which he concealed for three weeks, till it had extended from the ſize of a pea to that of a large tumor ſeven inches long, and four inches broad, riſing very high in its centre, and covering much of the parietal and frontal bone. This was an aneuriſm too large to be void of danger, and required deciſion in the opening of it, and delicate dreſſing to prevent ill conſequences, and bring it to a right ſuppuration. Mr Hill of Dumfries was deſirous of having it opened with cauſtic. The gentleman who had him under his care preferred the lancet. Upon puncturing the tumor, four inches of pure and florid blood flowed from it, and the pericranium appeared entire. Mr Hill now propoſed a looſe bandage, till the parts ſhould have time to contract; but again, ſays he, "I was overruled, and a thick compreſs was bound down over the tumor, and a doſſile put into the orifice." Next day, the integuments had adhered cloſely to the pericranium,

and a full ſac was formed at each end; and, to diſcharge theſe, the gentleman tore up the ſcalp, by thruſting a probe under it, and then renewed the compreſs. On the third day, the ſacs were again filled, the parts adhering ſo firmly, that the probe could not be introduced, though he tried it ſeveral ways, and with ſo much force, that the bone was laid bare in three places.

"Then followed an œdema over all the ſcalp. The gentleman to whoſe care the caſe was committed being out of town, the ſore was neglected for three days; the ſwellings increaſed; there was much pain, fever, ſickneſs, and a degree of delirium and raving. On the fourth, two cauſtics, notwithſtanding the inflamed ſtate of the ſcalp, were applied; and on the fifth, the bloody and purulent matter being diſcharged, and a fomentation applied all over the head, the delirium ſubſided, and the ſwelling ſoon vaniſhed. There were now three openings, each of which continued to run for many weeks, till the bones which had been laid bare exfoliated."

Mr Hill's philoſophical account of the delirium and fever, and his unphiloſophical aſperity in criticiſing the practice of his confrere, I paſs over in ſilence; obſerving only, that there was leſs blame in preferring the lancet to the cauſtic, than in making an opening inadequate to any purpoſe but that merely of diſcharging the blood. In every aneuriſmal ſac, the ſurfaces are inſulated from each other, are dead and ſloughing; they cannot adhere; the applying of compreſſes, in place of uniting the parts, only extends the miſchief; ſuch tumors ſhould be laid fairly open. There is no uniting (without an intermediate ſuppuration) the walls of an aneuriſmal ſac, eſpecially if the floor of that ſac be a carious bone.

Before I forſake this ſubject of injuries external to the cranium, I ſhall repreſent to you one which is attended with no danger of caries, but relates to the ſcalp only, a nervous and moſt ſingular diſeaſe; reſembling that which ariſes from ſome injury in bleeding in the arm, attended with little danger, but marked by convulſive motions, nervous affections of the moſt undefineable nature, and ſometimes with agonizing and periodical pain; pain varying according to the ſtate of the weather, or the patient's health.

"The man whoſe caſe I am going to relate to you, was about thirty-two years of age, ſallow, ſickly, and, I fear, diſſolute. He had loſt his health, his induſtry, and his morals, by an unfortunate blow on the head, which had deprived him of reaſon for many months; and, after a ſecond blow on the head, he ſuffered, in conſequence of the ſewing of the temporal artery, a very ſingular nervous affection.

" Firſt, about three years ago, he was attacked by ſome drunken companions of his own, who, knowing he had in his pocket thirty ſhillings of wages, and he refuſing to treat them, way-laid him in a dark paſſage, and knocked him down in revenge. He fell backwards into a cellar-ſtair, ſtruck the back of his head againſt the ſtones, and was carried to the hoſpital ſenſeleſs; where, notwithſtanding every care of the ſurgeons, he loſt his reaſon, continued many months inſane, left it at laſt in a weakly and languid ſtate, ill able to return to his hard labour, that of preſs-man in a printing-office. From that time he wrought little, and irregularly, became a miſerable vagabond, ſubſiſting chiefly on charity, and living among his friends.

" About three months ago, as he was coming down an open ſtair, which had no hand-rail, and was ſo dangerous as to have been the occaſion of frequent complaints to the landlord, he fell over the ſtair, and lighted among ſharp ſtones, and his forehead was laid open with a ragged wound, about four inches in length, extending from the forehead to the temple.

" The ſtair was notoriouſly dangerous, and the night dark, but he confeſſes that he was a little tipſy. Nothing ſo ſurely indicates a vagabond and idle life, as indifference to cleanlineſs and health; he did not return to his old aſylum, the hoſpital, but, with a penny-worth of Wade's balſam, and ſome filthy apparatus of rags, made a faſhion of dreſſing his wound, till, by filth and neglect, it ulcerated; the temporal artery was eroded; the blood ſprung briſkly from the corner of his ſore, and thus he was brought to the Infirmary.

" The houſe-ſurgeon ſewed the artery; he was laid in bed, and enjoined not to ſtir, leſt it ſhould burſt out again. He was very timid by nature, and the ſtudents took a pleaſure in alarming him from time to time, with ſaying, that it would ſurely burſt out again. About a fortnight after, the ulceration ſtill extending, the artery was again eroded; and at night, betwixt ten and eleven o'clock, when turning gently in bed, he felt his forehead moiſt; and, upon putting up his hand, found it wet with blood. The artery ſoon began to bleed *per ſaltum;* and the houſe-ſurgeon being called, the artery was again ſecured, by ſtriking a needle and ligature under it.

" After the firſt ſewing of the artery, he felt nothing unuſual; but after this ſecond ſtroke of the needle, he found, next morning, his mouth purſed up and contracted, his jaws ſo clenched that he could not ſpeak, while ſpaſmodic contractions extended along the neck and throat. His cheeks were flattened, and his mouth purſed up, and at the ſame time protruded as in a ludicrous ſimpre, or like one at-

tempting to whiſtle, and prevented by an inclination to laugh. The form of the face was remarkably changed; the ſphincter oris purſed up the mouth, while the zygomatic and triangular muſcles retracted the corners of it, and made the dimple natural to that part very deep; the cheeks were flattened, the mouth protruded; when he attempted to ſpeak, which he did imperfectly, the whole face was agitated, and his tongue got entangled between the upper and lower ranges of teeth, ſo that he imagined, if he perſiſted, he might bite it acroſs; and the throat and the whole neck was obviouſly contracted in a ſpaſmodic ſtate, accompanied with remarkable pain; and he could not open his jaws to receive the ſmalleſt particle of food, but lived on ſpoon-meat."

This fellow's face was drawn into ſuch a ludicrous ſimpre, that he was ſuſpected of being an impoſtor. If ſo, he was an ingenious one,—ſince it required ſome knowledge of our profeſſion to invent ſpaſms, ſo naturally accompanying a puncture of the ſcalp,—and a facetious and a merry one, for I never ſaw a phyſiognomy, nor contortions of face, ſo very ludicrous: The perſevering compoſure and gravity with which he ſat up in bed, the principal actor to a much amuſed aſſembly of ſpectators, was not art; he might indeed clench his jaws voluntarily, or purſe up his mouth, but I know no power by which he could contract the muſcles of his neck and throat, and keep them in a rigid ſtate aſleep or awake. Nor is the luxury of being fed with bread and water from a ſpoon any great temptation to linger in an hoſpital. We very often, from ſlight wounds of the ſcalp, ſee ſpaſms and contractions of the face and neck in thoſe who lie under no ſuſpicion, and pains continuing for months after ſuch wounds are healed; we find that a ſmart inciſion cures them, which would be a ſevere retaliation for any intended fraud, and a good preventative againſt any ſuch practical jokes. I have ſeveral times been a party in conſultations, where epilepſy had, in boys under eighteen years of age, followed ſometimes ſevere, and ſometimes ſlighter wounds of the head; and in which the epilepſy was connected with particular feelings in the ſcalp, as it often is preceded by an aura, or undefined coldneſs and convulſion running along a particular limb; and, though an inciſion does not always give relief, the keeping an iſſue in the wound, and thus exhauſting the irritability of the part, uſually does.

Any wound, ſurgical or accidental, in any part of the body where nerves are injured, eſpecially where they are expoſed, will produce the ſame diſorders. In Hydrophobia, the convulſion is plainly connected with a painful ſtate of the wound; in locked jaw, the convulſion uſually comes on when the wound heals; after an

amputation rudely performed, or ill cured, where the extremities of the brachial nerves are engaged in the cicatrice, moſt violent convulſions often ſeize the mutilated member; it ſtarts night and day with ſuch violence, as to allow the patient no ſleep nor reſt; and this pain and convulſion returns in paroxyſms, and continues for years. Firſt the ſtump inflames, then comes on a violent acceſſion of fever. Then the ſtarting begins chiefly when warm in bed. I have ſeen the point of an amputated humerus ſwell to the ſize of a buttock, accompanied with ſuch painful convulſions, that I was afraid of them bringing on ſome epileptic diſeaſe; and, without exfoliation, or ulcer, or any obvious change, the pain and convulſion ſubſides again. I have remarked, that after extirpation of the cancerous mamma, or of ſchirrous glands, the returning diſeaſe is preceded by ſuch nervous affections, extreme ſenſibility, and periodical pains in the wound;—a ſure prognoſtic that it will burſt out again in horrible ulceration, and that the patient will die.

"A young lady of fifteen years of age, playing with a younger ſiſter, and ſtruggling for an apple, ran her elbow upon the point of a knife which her ſiſter held in her hand; and with ſuch violence, that it ſtuck upright in the wound, the point being fixed in the bone. The young ladies were both ſo alarmed, that they had not power to draw it from the wound, and a man, who was paſſing, pulled it out rudely, and threw it careleſsly away; it never could be found, nor was it poſſible to tell whether the point of the knife had broken, and remained buried in the bone.

"The wound was on the outſide of the fore-arm, a mere puncture, about three inches below the joint; ſeemingly the knife had ſtuck faſt in the ulna. There was no bleeding, but ſuch as ſtopped ſpontaneouſly. She continued to walk for an hour, in cold weather, without being ſenſible of much pain; but ſoon the fore-arm and hand began to ſwell, the pain increaſed ſlowly; ſhe walked home in great diſtreſs, and it was three days before the leeches and poultices, which were applied, brought any relief; the pain at laſt ceaſed, the ſwelling ſubſided, the wound healed; but a very few days only had elapſed, when the ſwelling returned, the pain was excruciating, and extended along the ulna to the hand, while the little and ring fingers were contracted and ſomewhat benumbed; but the continued application of poultices and leeches, once more removed the ſwelling, and allayed the pain.

"This young lady has, for three years, ſuffered the moſt unaccountable and ſevere diſtreſs. She is not eighteen years of age, of a florid complexion, in perfect health, and in good ſpirits when not ſubdued by intenſe pain, free from every

thing like nervous diſeaſe. But, the pain which ſhe felt an hour after receiving the wound, and which returned with great violence, juſt as the wound healed, has returned periodically ever ſince; ſometimes after an interval of eight days, ſometimes for the ſpace of a fortnight, ſhe is well; but very rarely does ſhe enjoy an intermiſſion of a month without pain. Accident, or the ſlighteſt exertion, occaſions her pain to return, and at each return it ſeems more acute. If deceived by an interval of eaſe, ſhe thinks herſelf well, and walks, or rides, or dances: although ſhe carries the arm in a ſling, or holds the bridle in her left hand, a paroxyſm of pain comes on, which riſes ſometimes to the moſt extreme torture. The arm ſwells from the hand to the ſhoulder, and is tenſe, firm, and red, but without any peculiar appearance in the wounded part, or any chance of ſuppuration to bring relief. The pain extends from the finger-ends to the ſhoulder, and along the neck. She ſuffers the greateſt torture, when warm in bed. The pain precedes the ſwelling for ſome hours, but when the ſwelling comes, it brings no relief; it continues often increaſing for eight days; and when it ſubſides, there is left a remarkable degree of ſenſibility, about the place of the wound; ſhe ſhrinks when it is touched, or when even with the gentleſt preſſure of the finger I trace the ulna downwards from this point. Laudanum, leeches, fomentations, and all the uſual means which were at firſt ſucceſsful, now fail to give relief; while the paroxyſm continues, ſhe is confined to her couch, and dare not move; when it ſubſides, ſhe carries the arm in a ſling, for to let it hang excites, or continues the pain. When ſhe begins (after a paroxyſm of pain) to walk abroad again, a walk longer than uſual is ſure to produce a paroxyſm; and when it is brought on by any exertions ſo violent as dancing, or riding, it is peculiarly ſevere, and continues long. It is now three years ſince ſhe has ſuffered almoſt inceſſant miſery, with ſhort and uncertain intervals of eaſe. There was indeed a period of this time, (but of very ſhort duration), in which ſhe lived for months almoſt free from pain; but the pain is become of late extremely acute, and is accompanied with inſenſibility all round the wound, and numbneſs of the hand; the laſt paroxyſm, (which has juſt ſubſided), was ſo unuſually violent, that, though ill able to endure the motion of a carriage, ſhe has undertaken a journey of two days, and arrived in town ſtill in great diſtreſs, and willing to reſign herſelf to any meaſures, however ſevere, which may promiſe relief."

Such was the brief hiſtory of this young lady's ſituation, when ſhe was put under my care, by Mr Robiſon, ſurgeon, upon whoſe memorial on her caſe I addreſſed an

opinion to her friends, acknowledging ingenuouſly the difficulty of pronouncing whether thoſe ſymptoms might ariſe from the puncture of ſome nerve, or from a wound of the bone; reminding them, at the ſame time, of that drawing of Cheſſelden's, in his Aſteology, where, after the death of a patient, who had an anchyloſis of the knee-joint, there was found ſticking deep in the ſpongy head of the tibia, the broken point of a knife; and while I adviſed that an inciſion ſhould be made through the ſcar of the original wound, I alſo acknowledged that this was one of thoſe ſingular and diſtreſſing caſes, when our moſt deliberate opinions could be no better than a conjecture, and our operation an experiment, but one which was happily void of danger.

It was my earneſt requeſt, that this ſhould be a matter of reflection for her friends, who, in a caſe where the opinion of profeſſional men was ſo far from deciſive, a thouſand other circumſtances came to be conſidered. She returned home; but, after ſuffering the ſame ſucceſſion of intenſe pain, and imperfect relief, ſhe came to town to ſuffer the inciſion to be performed. I now called the advice of Dr Monro, who approved of the opinion I had given, and was witneſs to the inciſion I made, which was carried firmly and ſteadily down to the bone, and was nearly three inches long;—no remains of the knife—no apparent diſeaſe of the bone,—no peculiar feelings when the ſcar was cut acroſs, could be remarked. She bore the inciſion, and ſtill more painful ſearching of the wound, with perfect compoſure and reſignation. I am ſorry to acknowledge, that ſhe paſſed the enſuing days in extreme torture, and, though the wound healed in the moſt kindly manner, had no relief.

Upon her arrival at home, nervous and anodyne medicines, mercurial frictions, electricity, and every likely means of relief, were adminiſtered, under Mr Robiſon's care. Theſe were all ineffectual, till the diſeaſe, as if it had exhauſted itſelf, ſpontaneouſly ceaſed. Her recovery was as unaccountable as the cauſe of her diſtreſs. The paroxyſms became gradually leſs formidable, and in the fifth year of her diſtreſs, ſhe ſlowly recovered, and now enjoys uninterrupted and perfect health; relieved, perhaps, by the re-uniting of ſome reconciled or punctured nerve; a proceſs which you know, by much experience, nature does accompliſh, though very ſlowly.

Other ſingular caſes of anomalous nervous diſorders, ariſing from wounds, I ſhall reſerve for a fitter occaſion; obſerving only, that ſpaſms and pains, occaſional ſwellings of the head, and clenching of the jaws, ariſing from punctured wounds

of the head, need no more ſurpriſe us, than ſuch ſwellings of the arm, contractions of the finger, and capricious nervous afflictions, ariſing from punctures of the lancet, or even of a needle, or ſuch trivial wounds as that which I have deſcribed. I find ſlight notices of this diſorder ariſing from wounds of the ſcalp, or circumſtances which ſuggeſt to me that it is frequent, (though not remarked), in almoſt every book I read.

In Wepfer, I find an intereſting caſe of one Conrad Mejer, a lad of nineteen years of age, apprentice to a blackſmith, who was ſtruck by his comrade with his pinchers, with ſuch hearty good will that the part of the handle of the pinchers, about as thick as the little finger, ſtuck in the ſcull, near the angle of the os frontis. Yet he did not fall, but pulled out the piece of the pinchers with his own hands. He loſt no more than ſeven or eight ounces of blood, and the wound was dreſſed by his maſter with ſome ſtyptic powder. I ſhall not detain you with the further narrative concerning the treatment of the wound, how ſmall it was, ſcarcely admitting the point of a quill, or how little dangerous, till it was crammed with tents and digeſtive ointments, and cloſed up with plaſters;—how more profuſe the bloody matter ſeemed, when compared with the depth of the wound;—how the wound became fiſtulous, and admitted the probe to paſs under the temporal muſcle;—nor the various changes in the appearance of the wound, in the ſickneſs, or other ſymptoms: —Suffice it to ſay, that by its own nature, and by bad ſurgery, the ſinus continued long open; that while its orifice contracted the matter accumulated, the ſcalp and eye-lids ſwelled, and the glands of the neck inflamed;—that a cauſtic was applied, and the ſinus changed into an open ſore;—that then the cranium was found bare, and the probe ſeemed to penetrate through the temporal bone.

Three or four months paſſed in the cure of theſe fiſtulous ſores. " Wepfer ſaw the patient again in the ninth month, when the wound was entirely healed, and there remained only a ſwelled gland behind the ear, which diſappeared when the pain ceaſed. At the year's end, he was perfectly well, and as free from glandular ſwellings, as from pain; the wound ſeemed ſoundly cloſed, and had remained ſo for many months. Then it opened. He dreſſed it with a turpentine dreſſing, (lachrymam abietis indedit; he dropped into it a drop of the exudation from the fir-tree); it remained open only fourteen days, and when it healed the pain again ſubſided.

" At the diſtance of four months from this time, the patient felt for two days a ſenſe of creeping, running up the arm, from the elbow to the ſhoulder, night and day; and, on the third night, while in bed, he felt a chilneſs like ice, or ſnow, run along

the arm and fore-arm; and, after having three times had this particular feeling, he was ſeized with a convulſion of the mouth and left-cheek. During the following night, he was again aſſailed with the ſame diſorder, which laſted while he could repeat a prayer, and returned four times; and from this time it returned often, during both day and night, with intervals ſometimes of ſeveral hours. While the convulſion laſted, the ſaliva flowed from his mouth, and he had occaſion to obſerve, that this was increaſed by cold. In ten days more, the convulſion was ſo far increaſed in ſtrength and frequency, that he was often interrupted in eating, and day nor night had no reſt. The head was turned to one ſide, and the maſtoid muſcle was ſeen trembling with a ſort of convulſive motion. After this, he procured ſome kind of oil from a quack, and with a feather he anointed the afflicted arm, and the neck, and took of it inwardly. After this, the arm felt as if mice had been crawling along it. The head was agitated with a convulſive motion, backwards and forwards: The convulſion of the mouth leſſened, while the ſhock of the general convulſion was ſo great, as to precipitate him from his ſtool under the grate. In this deſperate condition did he ſtruggle from early in the morning till mid-day. He preſerved his ſenſes all along, but, after the violence of the convulſion was over, fell into a ſort of oppreſſion and languor. He fortunately diſcovered, that he could by hard labour prevent the convulſion. From this time he had no more fits. But ſtill the feeling of cold, and creeping, continues, and he prevents it terminating in any violent attack, by working at the anvil. I preſcribed Valerian powder, (ſays Wepfer), and found him ſtill well at the end of the ninth month *."

* " Ipſum St Blaſſii Die 18. Sept. 1673, rurſus vidi, vulnus plane conſolidatum fuit. Ante tres circiter menſes caput valde ſubinde doluit, quandoque adhuc vomuit. Glandula inſtar ſcrophulæ poſt aurem dolore vigente intumuit: eo ceſſante detumuit. Adhuc ſcrophula fabæ magnitudine ibi tangitur, ſub cuti mobilis. Nunc ne minimum dolorem patitur: nullus tumor tangitur. Appetit, mandere poteſt. Optime nunc habet. Conrad Mejer nunc 21. annum agens me convenit St Blaſſii 1674. d. 24. Martii vulnus ſupra tempus dextrum coaluit æſtate, coalitum manſit tribus menſib. ſemper indolens. Autumno 1673, declinante Menſe Octobris, recruduit, lachrymam abietis indidit: apertum manſit 14. diebus: poſtea iterum conſolidatum fuit: nullum amplius dolorem paſſus eſt. Die 3. Febr. 1674, in brachio ſiniſtro ab olecrano ad humerum ſenſit formicationis ſenſum diu noctuque per biduum die 5. Febr. noctu ter ab humero ad cubitum ſenſit frigus ceu gelu ad cubitum; mox ſupervenit convulſio oris et malæ ſiniſtri lateris. Die 6. Febr. idem quater noctu evenit, duravit per tribus vel quatuor, Pat. Noſt. Poſtea noctu diuque crebro invaluit ſæpeque per aliquot horas inducias conceſſit. Præſente motu convulſivo multum ſalivabat. Obſervavit a frigore ſymptoma hoc auctum fuiſſe. Die 16. Febr. tam crebro invaſit, ut diu noctuque nullam quietem conceſſerit, ſæpeque inter edendum impediverit, caput quoque ad

On various occaſions, I have ſuſpected that diſeaſe to be in the ſcalp, which was attributed to the ſcull, for I know not how ſymptoms of a nervous complexion, amounting even to epilepſy, could ariſe from the ſcull, or be cured by exfoliating a rough or blackened piece of bone. " A girl, of fifteen years of age, (ſays Mr Gervais), fell, in going down ſtairs, ſtruck her occiput, and lay without ſenſe or motion, bleeding from the noſe. The headach continued ſeveral years, for which ſhe was repeatedly bled, though much relieved by theſe bleedings. There remained a fixed pain in the back of the head; during fifteen days it was ſupportable, but then increaſed, and returned in regular paroxyſms. When ſhe rubbed the occiput ſtrongly with the hand, ſhe fell into a faint, and, from the time that the pain of the head had increaſed, ſhe had ſuffered daily eight or ten attacks of epilepſy.

" Mr Gervais, in examining the pained part, remarked a ſmall blackened ſpot on the upper and middle part of the occiput, and then the ſkin appeared ſoft and tender; and Mr Gervais preſſing by chance with his finger upon that ſpot, ſomewhat rudely, the girl fainted. He could not conceive that ſuch ſlight preſſure could be the cauſe of her fainting. When ſhe recovered, he again began to finger the part, and upon preſſing with the finger, ſhe again fainted. It was then only that he ſuſpected he was himſelf the cauſe of this ſyncope; and, upon preſſing with the finger a third and a fourth time, ſhe fainted every time he drew it acroſs the livid ſpot. Having failed to relieve this girl by the ordinary remedies, it was reſolved, in conſultation, to make an inciſion. They found the pericranium detached, and the bone affected; and the ſymptoms ſtill continuing, Mr Gervais was in doubt whether to trepan, or to expect relief from exfoliation; and, fortunately, the bone no ſooner exfoliated, than the girl was entirely relieved *." The periodical return of this pain,—the periodical pain

finiſtrum latus traxit: in muſculo maſtoideo videbatur motus aliquis tremulus, ſeu ſubſultorius. Poſtea inungebatur oleo quodam ab empirico conceſſo penna per totum brachium finiſtrum, collum, &c. etiam intus præbuit: Per brachium videbantur mures decurrere ab inunctione, item caput antrorſum et retrorſum ſuccutiebatur: Convulſio oris remiſit: Convulſiones à ſcamno ſubtus fornacem ipſum præcipitarunt. Duravit hæc ſuccuſſio à ſummo mane ad meridiem: ſemper mente conſtitit: poſt hanc ſuccuſſionem laſſitudo ſpontanea ſupervenit. Obſervavit à labore ſe paroxyſmum declinare potuiſſe: poſt hanc ſuccuſſionem nullum amplius paroxyſmum ſenſit: ſemper tamen adhuc ſenſus frigoris et leviculæ formicationis ſupereſt, quem excutit labore fabrili ferrario. Suaſi Pulverem rad. Valerian. per aliquot ſeptimanas utendum. Autumno Menſ. Octobris referebat ſe hucuſque à paroxyſmis immunem et optime valentem fuiſſe.

* " Une fille de quatorze ou quinze ans, tomba ſur le derriere de la tête en deſcendant un eſcalier; elle perdit connoiſſance et eut un ſaignement de nez: elle ſentit une violente doleur de tête qui dura pluſieurs jours, et

being followed by epilepſy,—the epilepſy being relieved by a continued ſuppuration of the part, in which the exfoliation was perhaps an accident, or the effect of art,—proves to my mind that this was merely an injury of the ſcalp. Nor can I find any difficulty, while we ſee ſuch periodical and diſtracting pains of the face, in Tic douloureux,—in wounds of the frontal nerve,—in punctures of the nerves of the arm, or ankle, in bleeding,—or, in the expoſure of nerves, in the cicatrix of a ſcar, or wound, in aſcribing theſe ſymptoms rather to an injury of the ſcalp, which may excite nervous diſorders, than to a caries of the bone, which we ſee daily unaccompanied with thoſe anomalous ſymptoms.

There is one circumſtance more which has often ſtruck me as ſingular. I mean

pour laquelle elle ſe fit ſaigner pluſieurs fois, tant du bras que du pied. Ces ſaignées la ſoulagerent beaucoup ; il lui reſta néanmoins une douleur fixe derriere la tête, qui d'abord fut aſſez ſupportable pendant quinze jours, mais elle augmenta enſuite conſiderablément, et prenoit par des accès reguliers. Lorſque cette fille ſe frottoit un peu fort le derriere de la tête, elle tomboit en ſyncope : independamment de cet accident, il lui arrivoit depuis que la douleur avoit augmenté, des mouvemens epileptiques huit ou dix fois par jours. M. Gervais examina l'endroit ou elle ſentoit cette douleur ; il remarqua une petite tache noirâtre à la peau, ſur la partie moyenne et ſuperieure de l'occipital : la peau etoit plus molle en cet endroit qu'ailleurs, elle paroiſſoit même comme contuſe : M. Gervais y appuya le doigt un peu fort, la malade tomba en ſyncope ; il ne s'imagina pas d'abord qu'un tel accident fut l'effet de cette preſſion : il recommença quand la ſyncope fut paſſée à appuyer le doigt au même endroit, pour bien examiner ſi il n'y ſentiroit point quelque derangement, la malade tomba encore dans le même etat ; alors il commença à ſoupçonner que c'etoit lui-même qui cauſoit cette ſyncope et pour mieux s'en aſſurer, il appuya ſur le même endroit une troiſieme et quatrieme fois, et chaque fois le même accident arriva. On eſſaya en vain de guerir cette fille par des remedes ; il fut enfin decide dans une conſultation qu'on decouvriroit cet endroit douloureux. On trouva le pericrâne détache de l'os qui etoit altere. Les accidens continuerent encore apres que l'os fut decouvert. M. Gervais balança alors pour le trepan ; cependant il crut pouvoir l'eviter, dans l'idee que l'exfoliation pouvoit ſuffire : en effet des que la piece d'os alteree fut exfoliee, tous les accidens diſparurent ſans retour. Scultet rapporte une cure à peu pres ſemblable. Un jeune garçon age de ſept ans tomba ſur la tête, et ſe fit une contuſion au cote du ſinciput, qui fut ſuivie de douleur et de convulſions : on calma, dit-il, auſſi-tot ces accidens par le moyen d'une peau d'agneau récemment écorché, qu'on appliqua ſur la tête de cet enfant ; mais cette douleur et ces convulſions ſe renouvelloient regulièrement à toutes les nouvelles lunes, ce qui obligea notre auteur, environ quatre mois apres le coup, à ouvrir l'endroit qui avoit été frappé, dans le ſoupçon qu'il y avoit une humeur entre le péricrâne et l'os qui corrodoit ces parties : il trouva le crâne noir et âpre ; l'endroit altere fut rugine ; il ſe couvrit enſuite de bonnes chairs, et l'enfant fut parfaitement gueri en peu de tems. Foreſtus rapporte une obſervation de même genre : ce ne fut que pluſieurs annees apres une bleſſure à la tête, qu'on s'aviſa de decouvrir l'os pour guerir une douleur violente et fixe qui duroit depuis le coup, et qui ceſſa en effet par cette operation." The caſe from Scultus, and that from Marchetti, have no connection, under heaven, with this ſubject. They are ſtuck in here as ornaments, not as analogies. They are caſes of ſuppuration, and (Marchetti's) of direct wounds of the brain itſelf, with a ſtilletto.

the extreme depreſſion of bodily ſtrength, and dejection of ſpirits, which often follows an injury of the ſcalp. I have ſeen patients fall into a ſort of hypochondriaſis, from which no exertion of ſpirits, nor native good ſenſe, could extricate them. The caſe of the Chevalier d'Entragues, an officer of rank in the French ſervice, is a lively pourtraiture of what every obſerving practitioner muſt have remarked in caſes leſs ſingular.

" The Chevalier d'Entragues, Colonel of the regiment of Bagey, was quartered (ſays La Motte) in our city; and, on entering his houſe one day, he ſtruck his head againſt the door-poſt, but ſo ſlightly that it merely knocked off his hat, and he felt nothing but the ſlighteſt pain. Yet, ſlight as the pain was, he paſſed a ſleepleſs night, and in the morning requeſted my advice. I found him low, with a feeble pulſe, and a ſlight pain in the head, at the meeting of the coronal and ſagittal ſutures. I bled him freely, and as upon ſhaving the head I found no mark of violence, no contuſion ecchymoſis, nor even redneſs of the ſkin, I thought it ſufficient to embrocate his head with oil of roſes, and ſpirits, laying over all a compreſs dipped in hot wine. He ſo entirely loſt his appetite, that he could take nothing but an egg, or a little ſoup, and he was confined to bed, with a ſort of vertigo. I was obliged to bleed and purge him, and give him a tea made of vulnerary herbs. I bled him thrice, and the pain gradually leſſened, till in ten days it vaniſhed *."

" He now propoſed to call Mr Troublet from Paris to viſit him, but the memorial which I wrote to Mr T. was ſo ſatisfactory to him, that, having commended my

* " Au mois de Février 1707, Monſieur le Chevalier d'Entragues, colonel du régiment de Bugey, qui étoit en quartier dans notre ville, entrant dans une maiſon, ſe heurta le deſſus de la tête, en gliſſant, contre le haut de la porte, qui fit tomber ſon chapeau, ſans qu'il ſouffrit dans le moment qu'une douleur ſi légere, qu'il ne s'en plaignit aucunement; cependant quelque leger qu'eut été ce coup, il l'empêcha de dormir la nuit ſuivante; ce qui le porta à m'envoier prier le matin de l'aller voir. Je lui trouvai le pouls très-foible, et une legere douleur qui occupoit le haut de la tête, dans le progrés de laquelle les ſutures coronale et ſagittale étoient compriſes en partie. Je lui fis une grande ſaignée; et comme, aprés lui avoir raſé la tête, je ne lui trouvai à l'endroit de cette douleur ni contuſion, ni ecchymoſe, pas même de rougeur, je me contentai, pour tout remede, d'une embrocation d'huile roſat et d'eau-de-vie, avec une compreſſe en quatre doubles, trempée dans le vin tiéde, par-deſſus. Ce malade perdit l'appétit, de maniere qu'il fut obligé de ſe réduire au ſeul uſage des bouillons et des œufs frais, et de garder le lit pendant quelques jours, à cauſe d'une eſpece de tournoiement ou vertige, dont cette foibleſſe fut ſuivie; ce qui me détermina à le ſaigner encore trois fois, lui donnant des lavemens tous les jours, et un verre de vulneraires, en forme de thé, l'apres-midi; et comme la douleur diminua de jour en jour, de maniere qu'en dix jours elle diſparut entierement, je me bornai à une fomentation d'eau de la Reine d'Hongrie ſur toute de la tête."

proceedings, he declined to come, and committed the entire care of this gentleman to me in the moſt flattering terms. Yet, ſlight as the occaſion of this diſorder was, he was long in ſo low a condition, that I was alarmed for his life. He was extremely feeble, melancholic, and ſorrowful, and continued in this condition four months."

This caſe he concludes with the following reflections: "There was not, perhaps, in the armies of France, a more ſpirited, nor a ſtouter man, than Le Chevalier d'Entragues, who yet had nearly died of an accident ſeemingly very unimportant. For three months, the ſymptoms were as ominous as in the deepeſt and moſt dangerous wounds; conſequences which aſſuredly had ariſen from the pain of the perioſteum, communicated through the ſutures to the dura mater and brain. By theſe communicating fibres of the pericranium, the nervous ſyſtem was irritated, ſo that the animal ſpirits, moving no longer in their uſual regularity and order, the patient's whole ſyſtem was weakened, and was re-eſtabliſhed again, when the ſpirits were made to reſume their due courſe, the ſoul then finding itſelf free." "To the oil of roſes I had joined ſpirits of wine in the embrocation; that by the ſubtilty of the ſpirits in opening the pores, the oil might be enabled to penetrate deep, and relax the tenſe and diſtended fibres of the perioſteum, which communicates through the ſutures with the dura mater, in which conſiſts the painful affections of the part, and the conſequent diſorder of the animal ſpirits *."

This gentleman died afterwards at the ſiege of Cremona, leading on the French troops with great bravery; and in his caſe, Mr La Motte ſeems equally proud of his philoſophy, his ſchool-learning, and his practice; but it is not to expoſe theſe that I quote his words, but to prove that the impreſſion reſted on his mind of this being an injury of the perioſteum, and that the complaints were nervous, as truly ſo as if they had been accompanied with convulſive and thrilling ſenſations, mentioned in the other caſes. However you may conſtrue the caſe, whatever judgement you may be inclined to form of the ſtrict regimen, and profuſe evacua-

* "Je joignis l'huile roſat à l'eau-de-vie, pour faire un liniment ſur la partie douloureuſe, dans l'intention que l'eau-de-vie, en ouvrant les pores des tégumens, fit pénétrer les parties onctueuſes de l'huile plus avant, afin d'amollir et de relâcher les fibres tendues du périoſte, qui ſe communiquent à la dure-mere par les ſutures, en quoi conſiſtoit le ſentiment douloureux de cette partie, et le dérangement que ſouffroient les eſprits; moien des fibres du périoſte qui paſſent au-travers des ſutures, dont le genre nerveux ſe ſentit irrité; enſorte que les eſprits ne ſe diſtribuant plus comme ils avoient de coûtume, le corps du bleſſé s'affoiblit, et il ne ſe rétablit que lorſque ces mêmes eſprits eurent repris leur route ordinaire, pour ſe diſtribuer à touts les parties du corps comme auparavant; et par ce moien les fonctions de l'ame ſe trouverent parfaitement libres," &c.

tions, of which I cannot approve, it is fit you ſhould be acquainted with this hypochondriacal lowneſs which ſo often follows wounds of the head, and is more frequent than epileptic or nervous feelings. It is a phenomenon which will often preſent itſelf to you, and you will remember it as the cauſe of thoſe idle ſpeculations of the ancients about the nervous nature of the pericranium, and its communications through the ſutures with the brain *.

Nothing is wanting to complete the hiſtory of theſe ſingular affections, ſo plainly reſembling the Tic Douloureux, and the injury ariſing from bleeding, but a proof, that the inciſion which, in the preſent, as in thoſe other nervous complaints, brings relief, neither opens any latent abſceſs, nor uncovers any corrupted bone, and can have, indeed, no poſſible effect but that of cutting acroſs the morbid nerves. " Magdelaine Mondet, a native of Lyons, twenty-two years of age, and married, was attached with her huſband to a troop of Charlatans: while they were exerciſing their craft in a little village in Dauphiny, her father, in a fit of anger, threw a ſtool at her head, and ſtruck her behind the ear, immediately above the maſtoid proceſs: though there was no outward wound, ſhe fell down, lay inſenſible, and all the ſymptoms were ſo alarming, that a phyſician from Grenoble, who viſited her four days after, declared that ſhe ſhould be trepanned. She recovered, however, without any operation, except that a pain continued, which extended from the injured part to the forehead and orbit. From this period, during four years the pain gradually leſſened; at the end of which period ſhe again returned to Lyons, apparently in

* " Une plaie contuſe des tegumens du crâne eſt quelquefois ſuivie de douleurs fixes ou vagues, de ſpaſmes, de convulſions qui ſubſiſtent long-temps après la guériſon apparente, et qui ont leur ſiège dans l'endroit même qui a été frappé. On y trouve ordinairement une rougeur plus ou moins vive, un peu de bouffiſſure, ou un point douloreux qui augmente par la preſſion du doigt. Dans quelques malades ces douleurs nerveuſes ont une intenſité plus ou moins grande, ſelon les variations de l'atmoſphère, et ſe préſentent ſous la forme du clou hyſtérique, du rheumatiſme chronique qui a ſon ſiège dans l'aponeuroſe occipito-frontale. Quelquefois ce ſont de véritables accès d'epilepſie. En voice des exemples. Une femme eut des mouvemens convulſifs dans tous les muſcles de la face, et des douleurs de tête cruelles pendant dix ans, pour avoir été heurtée rudement par le rebord d'un gueridon, à la partie inferieure de l'orbite, ſur le trajet du nerf ſous-orbitaire.

" Une autre femme tomba à la renverſe, et fut frappée à la région cervicale et à la partie droite du front. Elle reſſentit ſur le champ des douleurs très-vives dans l'endroit de la tête oppoſé ou coup. Les douleurs augmenterent malgré l'uſage de différens remèdes. C'etoit tantot le cou, tantot la mâchoire ſupérieure ou l'inférieure, et quelquefois la pointe de la langue qui devenoit le ſiège de douleurs lancinantes et très-aigues. Il ne ſe manifeſta jamais la plus legère tumeur. Quand les accès ceſſoient, il ſortoit par la bouche une eau ſalée et jaunâtre, et tous les muſcles étoient durs et tendus. Cette maladie ſubſiſta pendant pluſieurs années."

perfect health. Some time after her return, ſhe was attacked with a ſevere rheumatic pain of the wriſt, oppoſite to that ſide of the head in which ſhe had received the injury.

" After ſome violent altercations with her married ſiſter, ſhe abandoned herſelf to ſuch exceſs of fury, that ſhe reſolved inſtantly to drown herſelf; and, being overtaken and held, ſhe fell down without ſenſe or motion; and when ſhe revived, was paralytic on one ſide, that oppoſite to the original injury, and it was accompanied with loſs of voice, difficulty of deglutition, and even an oppreſſion of breathing. In this condition was ſhe carried to the Hotel-Dieu, where, by bleeding, baths, bliſters, and other means, ſhe recovered her ſpeech, her breathing became eaſy, but ſtill, to the very end of her complaint, ſhe faultered in her ſpeech, and the paralyſis continued, with a total loſs of ſenſe, as well as motion, in the parts. A month after her admiſſion, the palſy affected the right leg alſo, and gradually the whole body, except the right arm, the neck, and that ſide of the head. Though ſhe faultered much in her ſpeech, ſhe was intelligible, and her chief complaint was of vertigo, and of violent pains in the right ſide of the head, round the right eye. But this happily continued but a fortnight, when ſhe recovered by degrees, firſt the power of the right ſide, then her ſleep, appetite, and ſpirits, and in fifteen days more, the left ſide alſo was ſo free, that ſhe could walk through the ward with the help of ſtilts.

" We believed this woman quite reſtored, when, in the third week, ſhe had a relapſe more alarming than any of the preceding. She became univerſally paralytic, ſpeechleſs, and motionleſs, the neck, and one half of the face, only remaining free; but this laſted one day only, after which ſhe began to mutter. The difficulty of breathing and ſwallowing were as great as ever; and ſhe ſoon fell into a raging delirium, accompanied with convulſions; and during this fever, ſhe ſo far recovered the uſe of her right hand, as to rid herſelf eaſily of thoſe who attempted to hold her. The convulſion was ſo violent, that from time to time her head was ſo bent down as to touch her feet; and more than once ſhe would have projected herſelf from the foot of the bed, and ſtruck her head againſt the counterpane, if ſhe had not been confined in a ſtrait jacket.

" She ſtruggled three days in this furious condition, and appearing on the third day to be near her end, the laſt ſacrament was adminiſtered: On the fourth, the delirium ceaſed; and on the morning of the fifth, I ſaw her, and, ſtruck with the

capricious and anomalous nature of these signs, I repeated many of the questions which I had formerly asked, and now, for the first time, she mentioned, amidst a variety of replies, that she had formerly got a blow on the back of the head. I requested to see the place, and found it covered with hair as long and beautiful as any other part of the scalp; and, pressing with my thumb rather strongly along the part, to see whether there was any swelling, she was seized with a more violent convulsion than we had yet witnessed; she even fainted; and, upon repeating the pressure, it produced a convulsion as violent as a shock of epilepsy. She foamed at the mouth more than usual, and complained that the violence of the pain she had suffered seemed to shoot through the head from the part pressed upon to the angle of the eye. I told her, that since physic seemed to have no power over her malady, it appeared to me that she had no resource but in operation; a suggestion which, from her extreme sufferings, she received with pleasure. When I communicated this information, (hitherto unsuspected), to the physician, Dr Chol, he did not oppose my intended operation.

" I ordered the pained part to be shaved, an operation very difficultly completed, for the drawing of the razor over the part excited the convulsions. The shaved part was of a lively red colour, which I could not but ascribe to the razor, since there was no swelling. Well assured that the contusion of the cranium was the root of the evil, I made an incision behind the ear three inches long, extending from the mastoid process upwards. The incision went to the bone, excited no convulsion, was followed by no hemorrhagy, and was dressed lightly with charpie. Half an hour had scarcely elapsed, when a sister of the house came running to inform me, that she was perfectly cured, that she had risen without help, that she now spoke and swallowed with ease; and indeed I found her report true, and had pleasure in seeing his unhappy creature without the slightest remains of her palsy *."

Unless respectable authors have been so abandoned as to invent these details; so ingenious and skilful in lying, as to have contrived circumstances the most singular, inconceivable indeed, by any preceding analogy; we have all the proof we could desire of these anomalous, and very afflicting symptoms, arising from slight bruises of the scalp, and continuing and increasing for an indefinite term of years.

" A young man, (says Pouteau), twenty-four years of age, with every mark of sound health, fell from a window twenty feet high, and lighted on his head. This

* Pouteau, p. 282.

was at the age of eight years, and he lay for many hours without ſenſe or motion. He was bled, the uſual applications to the hurt part were not neglected, and he was entirely cured, ſaving only a painful feeling which continued in the part of the ſcalp that was moſt bruiſed.

" The period of his diſorder is much too long for him to recollect definitely every fluctuation of it; this, however, he cannot but remember, that he has ever ſince been afflicted with unremitting pains of the head, which ſome months ago, when he firſt conſulted me, became ſo poignant, that often he fell down ſenſeleſs in his chamber. By all that he ſays, I underſtand that his moſt acute pains are in the upper part of the right parietal bone, extending to the angle of the eye, the ſight of which is obſcured during the more violent paroxyſms of pain; and all the face, but eſpecially the right-ſide, is flushed with a painful and burning ſenſation.

" His hair is long and beautiful; an ornament which coſts him dear, for, every time the comb paſſes over the hurt part, the pains are exceſſive. The hairs are, at this part of the ſurface, peculiarly coarſe and ſtrong; they do not lie naturally, as in the other parts of the head, but briſtle up in a moſt irkſome way, when any accident excites the ſevere pains.

" The head being ſhaved at my requeſt, I perceive a degree of ſwelling, ſlight indeed, but accompanied with redneſs. The preſſure of the finger leaves no mark, but excites acute pains. I laid open all the affected part of the ſcalp and pericranium with a great crucial inciſion, and, having allowed a cup-full of blood to flow, dreſſed it up. From this time the pains ceaſed, and in a few days entirely vaniſhed, in conſequence of a ſerous and bloody diſcharge *." Theſe are a few of the obſer-

* " Magdélaine Mondet, quatre ans après le coup reçu, eſt tranſportée hors d'elle-même par le plus violent accès de colere. Les parties léſées par le coup n'en avoient perdu que depuis peu de tems l'impreſſion douloureuſe, et leur organiſation en étoit encore affoiblie. Dans ces circonſtances elles ſont accablées par un torrent de ſang; leurs vaiſſeaux dont le reſſort eſt affoibli, s'engorgent ſubitement et à l'excès; les filets nerveux avec leſquels ces vaiſſeaux ſont entrelaſſés, ſont tiraillés et irrités; l'impreſſion vive faite ſur ces nerfs, ſe communique de proche en proche juſqu'au cerveau même, ſuſpend et détoute le cours des eſprits animaux. La douleur occaſionée par la preſſion du doigt a produit, comme on l'a dit. les mêmes effets, et a eu les mêmes ſuits. Cette explication paroitra juſte, ſi on ajoute le ſuccès du moyen que j'ai employé pour la guériſon; l'inciſion fait aux téguments léſés en coupant les vaiſſeaux ſanguins et les filets nerveux, a vuidé les premiers et relaché les ſeconds, et auſſi-tot tous les accidents ont diſparu, et la guériſon a été ſi prompte et ſi entiere qu'il me parut démontré que la cauſe primitive de cette multiplicité des ſymptomes réſidoit toute entiere dans les parties extérieures de la tête. Ce n'eſt pas la ſeule occaſion ou j'aye obſervé combien les coups portés à la tête étoient dangereux, quoique leur impreſſion ne s'étendit pas au-dèlà des parties extérieures; l'obſervation ſuivante en eſt une preuve :

vations concerning this intereſting ſubject, which I have thought it my duty to lay before you. They are enveloped in a thick huſk of doctrine about nerves, and ſpirits, and humours, which I will not weary you by tranſlating. I would neglect nothing ſo remarkable, ſo peculiar as this, and yet would ſpare you every unintereſting detail. Having pointed with deliberation, and, I hope, with preciſion and clearneſs, the various injuries of the ſcalp, I haſten now to a ſubject more intereſting in an infinite degree; I mean, the conſequences reſulting from ſeparation of the dura mater from the internal ſurface of the ſcull.

OF SEPARATION OF THE DURA MATER.

THE blow which detaches the dura mater, may at the ſame time injure the integuments, or affect the ſcull; hence nothing ſeems more difficult than to aſcertain the ſimple conſequences of ſeparation of the dura mater, unallied with injury of the integuments or cranium. Yet I hope I ſhall be able, by a ſuite of facts, to prove, that the dura mater may be ſeparated even by a ſhock, without any direct injury to the ſcalp, or ſcull, and to explain to you all the varieties of this accident, and all its remote and unforeſeen conſequences.

" A little boy, of five years of age, fell from the firſt ſtorey of a ſtair, but lighted on his feet, and walked up ſtairs again, ſaying that he was not hurt; no impor-

" Au mois d'Octobre 1753, Mademoiſelle ***, âgée de vingt-deux ans, demeurant ſur le quai St Vincent, voulut prendre dans une Egliſe une chaiſe parmi pluſieurs autres qui étoient amoncelées; elle fut frappée en pluſieurs endroits de la tête par ces chaiſes qui écroulerent; Mademoiſelle *** ne fut qu'étourdie, elle ſe fit néanmoins ſaigner; malgré cette précaution elle fut ſujette depuis ce tems à des douleurs de tête continuelles qui augmentoient ou diminuoient ſuivant les variations de l'atmoſphere: elle fut encore ſaignée pluſieurs fois, et fit inutilement beaucoup d'autres remédes tant internes qu'externes; ſon embonpoint diminua conſidérablement.

" Je ne fus conſulté pour cette maladie qu'au bout d'un an. Après avoir fait raſer ſa tête, je découvris ſur l'un et l'autre parietal une eſpace rouge d'un pouce de diametre, la circonférence en étoit pâteuſe et légérement tumefiée. Je fis ſur chaque contuſion une inciſion juſqu'à l'os, tranſverſale aux ramifications des nerfs et des vaiſſeaux, et les douleurs ceſſerent auſſi-tot.

" Un mois après, cette Demoiſelle reſſentit encore une douleur incommode vers l'occipital. La tête ayant été raſée de nouveau, je découvris une autre contuſion moins conſidérable que les deux autres, et qui étoit échappée à mes premieres recherches; je réitérai le même moyen, la guériſon fut parfaite, et s'eſt tres-bien ſoutenue depuis ce tems."

tunities, queſtions, nor threats on the part of his parents, could ever extort from him any other anſwer, than that he was not hurt; indeed, they had little reaſon for their anxiety, the boy appearing to enjoy, for three months, the moſt perfect health. But, at the end of the third month, he was ſeized with a violent headach, accompanied with a puffing up of the eye-lids, and fits of vomiting; and, when the ſurgeon was called, he found the face ſuffuſed with a purple colour, and the boy deprived of ſpeech, and able only to point with his hand to the place of the pain. He was bled in the arm without loſs of time; he grew worſe, and was, a few hours after, bled in the leg, but almoſt immediately, and before the orifice was cloſed he expired.

" Mr Caſaubon being called to open the body, found without the cranium nothing particular, except a ſlight puffineſs of the integuments; but, on opening the ſcull, he found an extenſive abſceſs betwixt the dura mater and the inner ſurface of the right parietal bone; but neither within the ſcull, nor in any other part of the body, was any thing remarkable obſerved *."

Here we have preſented for our conſideration, in a ſhort plain narrative, a ſuite of moſt important facts. *Firſt*, A boy falls from a great height upon his feet, as it would appear, in the preſence of his parents, but certainly upon his feet; and the dura mater is detached, not by a blow, which might at once injure the cranium, and ſhake the dura mater; it is detached by the ſhock merely, without any concomitant injury of the ſcull. *Secondly*, The integuments being ſound, the cranium unhurt, the parts not diſpoſed to run quickly into diſeaſe, the child continues in perfect health, and when he is ſuddenly ſeized with the fatal ſigns, there is ſtill no conſpi-

" * Au mois de Mars 1789, un enfant de cinq ans tomba ſur ſes pieds, d'un premier étage. Il remonta auſſitot, en diſant qu'il ne s'étoit fait aucun mal. Les queſtions, les menaces mêmes de ſes parens, n'en purent tirer d'autre réſponſe. On n'apperçut, en effet, aucune altération dans les fonctions, et l'enfant parut jouir de la meilleure ſanté, juſqu'à la fin du troiſieme mois. A cette époque, il fut tout-à-coup ſaiſi d'un violent mal-de-tête, accompagné de bouffiſſure aux paupieres et de nauſées. Le chirurgien, mandé alors, trouva le viſage d'un rouge violet. Le malade n'articuloit déjà plus; il indiquoit ſeulement avec la main l'endroit de la douleur. Il fut auſſi tot ſaigné du bras, et comme ſon état empiroit encore, on le ſaigna du pied, au bout de quelques heures, et il mourut un inſtant après.

" M. Caſaubon fut appellé pour faire l'ouverture du cadavre, et ce fut alors qu'il apprit les détails qu'on vient de rapporter. L'extérieur de la tête ne préſentoit de particulier, que la tuméfaction des tégumens; mais, à l'ouverture du crâne, on trouva un abſcès conſidérable entre la dure-mere et la partie ſupérieure-laterale droite du coronal. L'examen le plus attentif ne fit découvrir d'ailleurs rien de remarquable, ni dans le reſte de cette cavité, ni dans les autres parties du corps.

cuous ſwelling of the integuments; and, when he dies, the cranium is found in its natural ſtate. *Thirdly*, It is remarkable, that here, as in almoſt every inſtance, the ſuppuration of this membrane is ſlow and inſidious in its progreſs; for this boy had continued three months in apparent health, no ſymptoms betrayed the danger: The parents had diſmiſſed their firſt anxieties and fears: yet all the while this fatal ſuppuration was ripening. The boy, the moment he is ſeized with the ſtupor, is gone, paſt remedy. The trepan could not then have ſaved him; the cauſe of this ſudden and fatal convulſion was diſcovered only after death. *Fourthly*, Though the ſuppuration was of conſiderable extent, (un abſces conſidérable), it had plainly ariſen from the mere ſeparation of the dura mater; for the dura mater alone was affected; long as it had been divorced from the cranium, neither was the cranium affected by this ſeparation, nor the brain by the diſeaſe of the membrane which immediately ſurrounds it; the ſeparated ſurface was alone purulent.

Yet I ſhould not, Gentlemen, aſcribe ſuch importance to a ſolitary caſe, nor attribute ſuch ſingular and unforeſeen conſequences to this general ſhock, were it not eaſy to prove the ſame fact in various ways. From the tender age of this little boy, he might have been unable, perhaps unwilling, to tell how he was affected by the ſhock; but others more intelligent have been immediately conſcious of the injury.

" A healthy man, born of ſound parents, and about thirty-five years of age, fell, in the month of December 1766, in going down the ſteps of the ſide-pavement of the Pont-neuf. His feet flew from under him; he fell perpendicularly on his breech; and it is a well-atteſted fact, (c'eſt un circonſtance bien conſtatée), that his breech only touched the ground, and ſuſtained the ſhock; and it is not leſs remarkable, that the moment he fell he felt his head ſo confuſed, that he could hardly get up. His fall was followed by no kind of pain. Mr Dupouy, a member of the French academy of ſurgery, knew him well, and had this relation from his own lips; was conſulted by him about theſe firſt conſequences of this concuſſion, and ſuggeſted ſome meaſures of prudence, to which Mr Gallois (the name of the patient), ſeems to have paid but ſlight attention. The confuſion of head continued unremittingly during four months, after which period it inſenſibly vaniſhed.

" After four months, or more, of undiſturbed quiet, his barber, in ſhaving his head, obſerved, in paſſing the razor over a particular ſpot on the top of the head, a dull ſound, which ſeemed to him very particular; it was a ſort of crepitation, like that of crumpled paper, or parchment, lying under the ſcalp; and, upon mentioning it to Mr Gallois, he was ſenſible, upon touching the part, of the ſame ſin-

gular feeling. At this time there was no inequality, neither riſing nor depreſſion of the part; the next day there was a tumor, the ſize of a half-crown piece, ſlightly elevated, and having a degree of pulſation; and, as it increaſed remarkably from day to day, he conſulted ſeveral, and at laſt took the advice of one, who declared it an aneuriſm, and adviſed compreſſion. A compreſs and bandage was applied; the tumor was eaſily repreſſed to the level of the perforation, in the parietal bone, but its preſſure occaſioned the moſt alarming inſenſibility. The compreſs was abandoned,—the tumor grew apace,—the opening in the parietal bone widened, and a number, both of phyſicians and ſurgeons, were invited, to conſult upon the caſe. One only imagined it to be an aneuriſm; many regarded it as a proper hornia, or protuſion of the brain; others, more prudent, ſuſpended their opinions on a caſe ſo truly extraordinary. Mr Gallois was free from every ſuſpicion of venereal taint; but as he remembered to have had ſcorbutic blotches in his younger days, the phyſicians were glad of this apology, (not knowing what elſe to preſcribe), of preſcribing antiſcorbutic medicines.

" This courſe of antiſcorbutics, far from interrupting the growth of the tumor, ſeemed to produce fever, and rather to augment its growth, for its increaſe ſeemed peculiarly rapid while he took theſe remedies. It roſe to the ſize of a turkey's egg, and was painful, with this remarkable peculiarity, that a ſlight compreſſion aſſuaged the pain. But, the inſenſibility which followed compreſſion was ſuch, that he was more willing to endure the pain, than be thus relieved. This gentleman, abandoned, in the laſt months of his exiſtence, to all kinds of Empyrics, leſs weakened, perhaps, by their remedies, than diſpirited by the melancholy proſpect before him, fell gradually lower, in ſpirits and in ſtrength, and expired on the 17th of April 1763.

" Mr Louis, without diſordering the tumor, cut through the integuments, ſcull, and dura mater, with one circular inciſion; and having raiſed the whole, he found that the tumor, the ſize of a fiſt, grew from the ſurface of the dura mater; that it was of a regular circumſcribed form, ſomewhat compreſſed, where it lay under the ſcull; more prominent, where it roſe through the circular opening; and ſo far convex, as to make a correſponding depreſſion in the ſurface of the brain. The lower ſurface of the dura mater was thickened, and its veſſels enlarged, and almoſt varicoſe. The tumor had no adheſion to the opening in the cranium *."

This caſe, while it ſtrengthens the preceding teſtimony, brings new and intereſt-

* Academie Chirurgie, tom. 5.

ing concluſions along with it. It brings the ſtrongeſt conviction home to the mind, that not only a direct blow upon the head, but any ſhock, will detach the dura mater, which, if the patient ſurvive, muſt generally draw after it the death of the ſcull; for, the internal ſurface of the ſcull is in the ſame critical ſtate that the external ſurface was, when the integuments, (under the regimen of the older ſurgery), were either cut away, or dreſſed apart from the ſcull, till the ſurgeon was gratified, and his conſcience compoſed, by an entire exfoliation of the ſuſpected bone. It ſhows, that a perſon of adult years, and attentive to their own feelings, can diſtinguiſh the ill conſequences of the ſhock. In this caſe is marked, in a peculiar manner, the ſlow progreſs of ſuch diſeaſes, and the long interval of doubtful health, and indefinite feelings of ſomething diſordered, which precedes the more deſperate ſymptoms; and it proves, above all, a new and intereſting fact in the pathology of the dura mater, viz. that, after a ſeparation of the dura mater, when the matter is abſorbed,—when the ſurface of the membrane is healed, without being re-united, —when the firſt ſymptoms have, as in this caſe, ceaſed, the membrane is diſpoſed to form warty, or fungous tumors, which, by their preſſure, affect the ſcull.

In one of the following ſtates and conditions, the dura mater always muſt be after a violent ſeparation from the internal ſurface of the ſcull: *Firſt*, Either, the bone being hurt, (as generally happens, in caſes where it is ſhaken by a blow), the dura mater cannot re-unite, its ſurface will ſuppurate, and the patient die, with ſhiverings, ſtupor, and palſy; or, *ſecondly*, the dura mater may continue ſeparate, and yet its ſurface heal, but with a diſpoſition to form theſe fungi, which betray its unhealthy condition; for the cranium, by preſſure on its lower ſurface, becomes carious, part of it is abſorbed, the fungus begins to protrude through a ſmall circular opening, and the fatal ſign of pulſation in the tumor, is felt, which pulſation is, indeed, the motion of the brain: Then the opening enlarges, the fungus increaſes, the brain is at the ſame time diſeaſed, and ſometimes ſuppurates, and the patient, ſeized with ſtupor,—with epilepſy,—ſometimes with howlings, and the moſt horrible convulſions,—expires. But, *thirdly*, it occaſionally, perhaps often happens, that the dura mater, though completely ſeparated, is, after an interval of danger, re-united with the ſcull, and by a proceſs which at once thickens the membrane, and re-unites it to the ſcull with peculiar firmneſs, the difference betwixt the attachment of the natural and lacerated portion being too palpable to be overlooked. But theſe are accidents which will come out in proof ſpontaneouſly; allow me, now, to call your attention to the circumſtances of this individual caſe; reflect on them, and you will find, that they admit but of one ſimple theory: viz. that the dura mater was ſeparated by the ſhock;—that while the dura mater was in a

ſtate of ſuppuration, there was a period of danger, accompanied with confuſed feeling, which did not ceaſe for four months;—that the dura mater, though healed, was not found; it continued ſeparate from the ſcull; tuberculous tumors were formed on its ſurface; the ſcull, by a ſlight preſſure in this unnatural ſtate, became carious, ulcerated, and was ſo far eroded, as to allow the tumor to protrude;—the ſcalp (lying over a bone thus diſeaſed) did not riſe into that prominent, circumſcribed, puffy tumor, which marks a recent injury, and which is produced by putrid air, incloſed within diſeaſed cellular ſubſtance, but was dry, and crepitating, like rumpled paper, a phenomenon well correſponding with the preſumed condition of theſe integuments, outwardly alive, and not much diſtended with ſwelling, but inwardly diſeaſed, or rather dead,—and holding no connection with the ſcull, merely covering a tumor, unconnected with it, and, in ſhort, truly that which it is in the report ſaid only to reſemble, *parchment*, *dead ſkin!*"

This caſe reminds us, that bone is a perpetual ſecretion; that its earthy matter is in continual circulation, alternately ſecreted, and re-abſorbed; that whatever accelerates the action of its ſecreting arteries, as blows, ill-united fractures, or other injuries, excites them ſometimes to form enormous tumors; while, on the contrary, every tumor, foreign to the bone itſelf, having no connection with the vaſcular ſyſtem of the bone, ſo as to excite its arteries, hinders their lively action, by preſſing upon them, prevents their ſecretion, and waſtes the bone. It is by preſſure on one ſide, that bones (as in the cervature of the ſpine) are diſtorted. It is by preſſure that lame ſailors, and other ſcoundrally mendicants, almoſt annihilate the bones of their leg, diſtort the foot, and ſqueeze the tibia and fibula cloſe together. It is by preſſure that a bone without ulcerating diminiſhes in ſize, and becomes ſoft as wax; and thence it often happens, that the bone lying under the oppreſſion of any great tumor, cuts, (during operation, or in diſſection), like wax.

In the German Ephimerides, is to be found another caſe ſtill more intereſting, and farther confirming this ſingular fact of the ſeparation of the dura mater by a general ſhock; and of that ſurface which remains detached, forming fungi, and deſtroying the ſcull. "This man was about fifty-one years of age, fell from his horſe, and was ſenſible of a violent concuſſion of the head; a diſtreſſing pain enſued, but it ſoon vaniſhed, and the patient thought no longer of his fall, nor of this pain. About four years after, he became conſcious of a loſs of memory; and this malady increaſed ſo from day to day, that he at laſt forgot what he had ſaid or done the mo-

ment before. Then came cruel and inceſſant fits of epilepſy. Thoſe paroxyſms ſeemed for ſix months to be appeaſed by the medicines he took; but there followed next pains of the head, excruciating, unremitting, and continual, which no remedy could alleviate, and which in ſix months more proved fatal; and ſo dreadful were theſe pains which affected the left ſide of his head, in the form of megrim, that the left eye was convulſively turned in its ſocket, by the exceſs of pain.

"On opening the ſcull, the middle and fore part of the right parietal was carious, and deſtroyed in a ſpace equal to the ſize of a half-crown. Leſſer ſpots of caries were obſerved in various parts of the ſcull-cap, while the left parietal was corrupted by a fungous excreſcence from the dura mater, which extended towards the orbit, and had deſtroyed alſo the cribriform plate of the œthmoid bone."

Here we ſee again the ſudden ſhock ſeparating the dura mater, perhaps to a great extent from the ſcull. The bone dying, and falling into general diſeaſe, by the loſs of its nouriſhing membrane; and that fungus, (which it ſeems the peculiar diſpoſition of the dura mater to produce, when healed apart from the cranium), deſtroying the parietal bone, making its way through the thin plate of the œthmoid bone, and cauſing death before it had growth ſufficient to produce an external tumor.

It ſeems to me, that every cauſe which ſeparates the dura mater, and keeps it ſeparate, whether that cauſe be a caries of the bone, from a blow,—a ſlow and ſpontaneous caries, from diſeaſe,—or a febrile caries, from cold,—has often the ſame effect with the ſeparation of that membrane by a ſhock.

"A woman of forty-five years of age, fell upon a beam, and ſuffered a ſevere contuſion in the head. The pain which followed was yet very ſlight, and ſoon vaniſhed. A tumor, the ſize of a filbert, appeared, and continued ſtationary for twelve years, without trouble or pain; when, in conſequence of recent bruiſes, the tumor grew daily, till it attained to the ſize of thirteen inches in diameter, and ſeven in heighth, occupying the whole of the left parietal bone, encroaching alſo a little upon the right, towering to ſuch a height, as to reſemble the head of a new-born child. So rapid was its growth from day to day, and the pain was ſo acute, that it was judged that no time ſhould be loſt in ridding this woman of her tumor, and, as there was felt a deep-ſeated pulſation, it was judged right, for fear of hemorrhagy, to apply rather a ligature, and decline operating with the knife.

"The ſurgeon, accordingly, put a ſilk cord round the tumor, which he lightened more or leſs daily, according to the degree of pain, until the fourteenth day,

when the root of the tumor, meaſuring only an inch in diameter, was cut acroſs with a knife. The maſs of the tumor weighed four pounds, ſix ounces; and, it was now ſeen, that the ſcull was carious through both its tables, and that the pulſation was that of the brain communicated through the tumor, raiſing the baſis of it at every ſtroke. In a few weeks, the patient was ſeized with convulſive motions of all the oppoſite ſide, and her death was immediately preceded by violent convulſive ſtruggles, which laſted ſix hours.

" On examining the head, the caries was found extremely irregular in its border, forming an opening from four to five inches in diameter, while various ſpiculæ, projecting from the borders of this opening, transfixed the fungus. The dura mater itſelf was ſound and clean, without ſpot or blemiſh; but where the fungus roſe from its ſurface, it was greatly thickened in its ſubſtance, (to three times its natural thickneſs), and had formed inſeparable adheſions with the brain and pia mater *."

I ſhould now call your attention to the ſerious and important purpoſe of this part of my diſcourſe, to teach you how to form a juſt prognoſtic in theſe caſes, and to mark the inevitable conſequences of ſuch ill-judged operations; but that I think there is one circumſtance concerning the ſeparation of the dura mater ſtill unexplained, which it will be gratifying, and perhaps uſeful, for you to underſtand. We are at no loſs, you will obſerve, to aſcertain thoſe effects of the ſeparation of the dura mater, when that ſeparation is immediately fatal, or when tumors are formed upon its ſurface, and the patient's ſufferings protracted for years. But when, in place of proceeding to ſuppuration, or giving riſe to tumors, the dura mater, after a ſlight ſuppuration, is re-united with the ſcull, and the patient reſtored to health; by what ſigns, or appearances, ſhall we know that the membrane has been thus ſeparated and re-united? It may not be, in itſelf, a matter of eſſential importance to aſcertain this fact, but it will give us confidence in all our other concluſions, if we can ſatisfy ourſelves, *firſt*, that the dura mater, when ſeparated by a blow, generally ſuppurates; *ſecondly*, that when ſhaken by a general ſhock, it ſometimes heals apart from the ſcull, and ſhoots out from that ſurface which was once connected with the ſcull, fungous tumours, which deſtroy it. *Thirdly*, That the ſlow receſſion of the dura mater from a corrupted bone, alſo leaves its ſurface in a condition prone to the generation of fungi: And, *finally*, that there is reaſon to believe, that the

* Academie de Chirurgie, tom. 5. p. 52.

dura mater, which re-unites ſo eaſily with the outer ſurface of the ſcull, in caſes of fracture, is alſo often ſeparated by ſhocks, or blows, (which produce only ſlight confuſion, and very tranſient ſickneſs or pain), and *re-unites*, without the ſlighteſt ſuſpicion, on the part of the ſurgeon, that any derangement, ſo dangerous as the ſeparation of the dura mater, had been produced.

" A dragoon, about forty years of age, fell from his horſe, and, from that moment, during the ten years that he ſurvived, he felt, after every ſlight irregularity, a burning heat in the cheſt, and oppreſſion of breathing, amounting almoſt to ſuffocation. Yet, he did his duty all along, as a ſoldier, with alacrity.

" One day, while ſtanding centinel, he was, without any prediſpoſing cauſe, ſeized with his uſual pain, accompanied with ſuch oppreſſion of breathing, that he was carried to the hoſpital, almoſt ſuffocated; and there, after being bled, and taking a little of a pectoral ſyrup, he almoſt inſtantly expired.

" On the inner ſurface of the cranium, where the great arteries of the dura mater make their impreſſion, and where theſe furrows uſually ceaſe, there was, on each ſide, a large hollow, capable of containing a wallnut, and each hollow was filled with a large tubercle, proceeding from the ſurface of the dura mater, and adhering very firmly to the bone; and it was eſpecially remarkable, that the dura mater adhered, on the right-ſide of the vertex, ſo very firmly to the inner ſurface of the ſcull, that it could not be ſeparated without the greateſt difficulty; while, on its lower ſurface, it adhered with equal firmneſs to the pia mater beneath.

" This unnatural adheſion of the dura mater to both the pia mater and ſcull, was plainly no other than the cicatrix of ſome former ſeparation; for, the lower ſurface of the parietal bone, correſponding with this adheſion, was irregularly callous *."

* " Cataphractarius, 40. annorum, ex equo delapſus, ab eo tempore, per decem dein annos, a quocunque abuſu rerum non naturalium, ardorem pectoris, et reſpirationem difficilem, ad ſuffocationem uſque, perpeſſus eſt.

" Toto tamen iſto tempore munera ſua militaria alacriter peregit.

" Tandem, excubias agens, nullius cauſæ procatarcticæ conſcius dolore prædicto, et tanta ſimul reſpirandi difficultate corripitur, ut fere jam ſuffocatus ad valetudinarium deferretur; ubi poſt adminiſtratam ipſi venæ ſectionem, et exhibitam mixturam pectoralem reſolventem, brevi animam egit et efflavit.

" In parte interna ollæ cranii, ubi arteriæ duræ matris ſulcos eidem imprimere ſolent, et ubi alias hi ſulci in oſſe bregmatis evaneſcunt, ex utroque latere cavitas inſculpta aderat, quarum ſingula nucem juglandum capiebat.

" His duabus cavitatibus reſpondebant duo tubercula ex dura matre prominentia, eaſdemque perfecti replentia, iiſque valida adhæſioni adnata. Præterea dura mater ex dextro verticis latere *cum hæmicranio ita valide cohæſit, ut hoc difficillime ab illa avelli potuerit. In eodem loco dura mater inferius cum ſubjecta pia matre ſimiliter cohæſit.*

Be aſſured, that in ſpeaking thus particularly of tumors proceeding from within the ſcull, I have been inſenſibly led on to this ſubject, by conſidering the various conſequences of this ſeparation of the dura mater; that I have not entered into this detail, merely that I might explain the philoſophy of theſe caſes; nor do I ſearch the records of medicine, for tales of miſcarriage and imprudence, calculated to raiſe or to gratify a petulant temper, to ſtain the reputation of great men, "To ſtrike the monuments where noble names lie ſleeping." By thoſe memorable anecdotes which I am now going to relate, I mean merely to acquit myſelf of an important duty; to impreſs you with juſt and ſerious fears of entering upon any ſurgical enterpriſe, where ſuch tumors ariſe from within the ſcull. The caſes which I have already detailed, are not merely deſtined to adorn the works of a learned ſociety, or to be a matter of ſtupid wonder, but to ſerve as uſeful warnings; they are forms of diſeaſe, horrible, indeed, in their concluſion, but in their beginnings hardly to be diſtinguiſhed from the moſt trivial tumors; and, that ſurgeon is in great danger, who does not, from reaſon and reflection, (for experience few can have in ſuch rare caſes), form a decided opinion the moment ſuch a tumor is expoſed, who does not reſolve, with a ſteadineſs not to be ſhaken, "not to touch it for the world." The good that can be done is problematical, the danger dreadful; and the ſurgeon who but allows himſelf to conſult upon ſuch a caſe, or to hearken to the intreaties of a patient wearied of life, is in danger of robbing him of life. The diſeaſe, it muſt be acknowledged, is fatal in the courſe of nature, yet, wherever operations have been attempted, the patients have been directly put to death by the hands of the ſurgeon.

"In the year 1697, a man preſented himſelf at the Hotel-Dieu, of forty years of age, having a firm but pulſating tumor, covering almoſt all the parietal region, and towering to three inches in height. He had been diſtracted with pains for a year; during ſix months he had been blind, and was now almoſt deaf. Mr Sivert, who received him, conſulted with Mr Joſeph Petit; they found it imprudent to make inciſion into ſuch a tumor; perhaps they apprehended it to be an aneuriſm; and it is expreſsly mentioned in the narrative, that they feared leſt he ſhould bleed to death. Veneſection and purging ſeemed but to aggravate his ſufferings; when at laſt, exhauſted by his torments night and day, and driven to utter deſpair, he beſought them, he demanded, that ſome operation ſhould be performed, and declared, that if they refuſed his intreaties, he would cleave this tumor with his knife. They

"Atque hæc præternaturalis duræ matris cum cranio, *ac pia matre, coheſio nihil aliud quam cicatrix poſt vulnus relicta, fuiſſe videbatur.* Nam in oſſe bregmatis calloſa inæqualitas eidem correſpondens cernebatur."—*Baader.*

complied. The apex only of the tumor was opened with a ſcalpel; nothing iſſued but florid blood, which, in ſpite of compreſſion with bandages, and the preſſure of the hand, continued to flow for two days inceſſantly. He died on the ſecond day *."

" A ſoldier, while confined to the hoſpital in Straſbourg, by a ſwelling of the thigh and haunch, was ſenſible that a ſmall loupy tumor, ſeated on the forehead betwixt the eyes, was increaſing rapidly, but without pain. While the ſurgeons applied reſolving embrocations and cataplaſms, it increaſed ſo as to depreſs the upper eye-lid, and cloſe the eyes. Mr Le Mair, ſurgeon to the military hoſpital, a man eſteemed for diſcretion and good ſenſe, propoſed to the patient to have the tumor opened. He conſented; a crucial inciſion being made, diſplayed a white, ſpongy, and fungous-like maſs of fleſh, quite inſulated. The fingers could be turned entirely round it, and one finger could even be introduced within the cranium, till the dura mater and its pulſations were ſenſibly felt. Inſtantly after this operation, the man fell into a profound lethargy, from which he never awoke, but expired on the fifth day!

" On diſſection, the frontal bone was found diſſolved by the preſſure of the tumor, which had alſo made a deep impreſſion on the ſubſtance of the brain."

Mr Le Grand mentions the caſe of a gentleman belonging to the Court of Bruſſels, who had venereal chancres, which had now been fairly cured. This was in the

* " Le 29 Mars 1697, il vint à l'Hotel-Dieu un homme de quarante ans, avec une tumeur conſidérable qui occupoit preſque toute la région du pariétal gauche; elle avoit trois pouces d'élévation; ſa conſiſtance étoit aſſez ferme, et elle avoit des pulſations. On en attribuoit la cauſe à une douleur de tête très-violente que le malade ſouffroit depuis plus d'un an; qui l'avoit rendu aveugle depuis ſix mois, et ſourd de l'oreille gauche. M. Sivert, aux ſoins de qui ce malade fut confié, prit l'avis de Joſeph Petit, chirurgien en chef de cette maiſon, célèbre praticien de ſon temps, qui après avoir bien examiné la tumeur, prononça qu'il ne falloit pas l'ouvrir, que les os étoient cariés, et qu'en faiſant une inciſion, il y auroit riſque d'une hémorrhagie qu'on ne pourroit arrêter; peut-être avoit il l'idée que la tumeur étoit anéuriſmale; l'obſervation ne le dit point. Quoiqu'il en ſoit, on ſaigna et on purgea le malade dans l'intention de calmer ſes douleurs de tête; elles parurent, au contraire, augmenter conſidérablement à la ſuite de ces ſecours; cet homme déſeſpéré de n'avoir aucun repos ni nuit, ni jour, demandoit inſtamment qu'on l'opérât, ſinon qu'il fendroit la tumeur avec ſon couteau; on prit le parti de lui donner la ſatisfaction qu'il ſouhaitoit ſi ardemment. La pointe de la tumeur fut inciſée avec un biſtouri; il n'en ſortit que du ſang artériel; malgré l'appareil convenable et la précaution de le contenir par une compreſſion faite avec la main, le ſang continua de ſuinter, et le malade mourut deux jours après.

" A l'ouverture du crâne, on trouva l'os pariétal gauche tout à-fait rongé; une fongoſité adhérente à la dure-mere traverſoit la carie, et étoit percée de toutes parts par des pointes oſſeuſes qui entroient dans la ſubſtance. Il y avoit deux autres éminences charnues à la dure-mere; l'une ſous le coronal, l'autre ſous l'occipital, aux parties antérieure et poſtérieure de la déperdition du pariétal; elles comprimoient le cerveau, qui d'ailleurs étoit dans l'état naturel. La faux avoit acquis beaucoup d'épaiſſeur.

year 1758; and, in a little while, he perceived a ſwelling on the crown of the head, in the place of the ſagittal ſuture, which was very little noticed; it was flat, and yet was miſtaken for a loupy tumor. Its increaſe was by no means rapid, yet, by the year 1762, it was grown to ſuch a ſize, as to fill his night-cap. Its growth was not attended with the ſlighteſt ſign of redneſs, pain, nor any irregular ſymptom; yet the baſe of the tumor was no leſs than twelve inches in circumference. Mr Le Grand was perſuaded it would be folly to meddle with ſuch a tumor; but the impatience of this gentleman, who could not wear his wig, nor go abroad about his neceſſary duties, was ſuch, that other ſurgeons, contrary to the advice of Mr Le Grand, applied a cauſtic to this tumor. A few days after, the patient was ſeized with convulſions, and on the eighth day he died. The tumor was found to be of a fungous nature, and to have deſtroyed two thirds of both parietal bones."

In children, too, we have examples of the ſame ſufferings, the ſame bloody and ſhocking cataſtrophe, as in the following caſe recorded by Mr Choppart.

" A child being returned from nurſe, of two years of age, quite lively, and without any diſorder, was attacked ſoon after with a continued fever, but recovered. About a month after, the mother, in combing its head, obſerved a ſmall tumor over the right ear, which gradually increaſed, till, in the courſe of five months, it had attained the ſize of a hen's egg, but without diſcoloration or pain. Mr Coutavoz was called, who carried along with him Mr Choppart, then his pupil. Coutavoz thought fit to make an inciſion in the centre of the tumor; only a little black blood flowed out; the child was dreſſed; Mr Choppart viſited in the evening, and found the child eaſy, the dreſſing diſcoloured with a little flux of ſerous and fætid blood; but next day the child died.

" Such an event, unpreceded by pain or other ſymptoms, induced them to examine the head carefully. It was opened by Mr Choppart, who found a fungous tumor of the dura mater, which had made its way through part of the parietal and temporal bones, forming within, a proportioned depreſſion in the ſubſtance of the brain."

But of all the miſadventures of this nature, that which we mention with the greateſt reluctance and pain is, the authenticated impropriety of Heiſter's conduct, in a caſe, too, where the ſigns of danger were leaſt of all equivocal, when we ſhould have expected a man of very inferior talents to form ſenſible and prudent reſolutions.

" A Ruſſian ſoldier, a big and athletic man, of thirty-four years of age, who led a diſſolute life, and had often ſyphilitic infections, which were rather ſup-

preſſed by any medicines he had taken, than entirely extinguiſhed, was obliged, with a vitiated conſtitution, and under every privation of food and reſt, to follow the camp through every viciſſitude of air, ſleeping often uncovered on the damp unwholeſome ground. From theſe cauſes aroſe a tumor on the left ſide of the head, at firſt no bigger than a walnut, but gradually enlarging, ſo as to occupy the whole of the left, and part of the right parietal bone, beyond the ſagittal ſuture. Slight as the pain of this tumor was at firſt, he was ſo alarmed as to look round for aſſiſtance; the military ſurgeons having tried every thing in vain for his relief, and prognoſticated nothing but the moſt fatal iſſue, he came to Helmſtadt, and put himſelf under the care of my patron, friend, and protector, Heiſter. Heiſter, with his uſual ſolicitude, examined this tumor, found it almoſt immoveable, and very hard; and recollecting how often he had cured ſuch tumors with the knife, he declared to the patient, that there was no cure but the knife, neither could he promiſe abſolute relief, ſince he knew not how deep its root might lie, nor in what degree it might have affected the parts beneath the cranium, or perhaps the brain, ſince his ſenſes were at times much diſturbed. Yet, (ſaid the illuſtrious preſident), this is one of thoſe caſes to which the maxim of Celſus may be applied with peculiar propriety; "Melius eſſe experire anceps remedium, quam nullum."

"The patient, impelled by the deſire of being reſtored to health, declared himſelf willing to ſubmit; and his conſtitution being duly prepared by medicine, a cauſtic of alkali and quick-lime, (ſuch as Heiſter often uſed for the opening of all varieties of tumor), was laid upon the part. Three hours had ſcarcely elapſed, when a profuſe hemorrhagy, apparently from cutaneous veſſels, came on, but was ſoon ſuppreſſed by ſpirituous applications, ſo that the patient revived. In the evening of that day, the head being unbound, the plaſters and compreſſes which had circumſcribed the operation of the cauſtic being taken away, and the tumor opened, it was found neceſſary to bind it up again, on account of bleeding. The patient felt ſo little pain, that, emboldened by his eaſy ſtate, he was guilty of the greateſt imprudence. He walked two hours, in chilling weather, in a hall open to every wind, (rudibus tunc temporis ventis), whence he was preſently affected with ſhiverings, with laſſitude, and a creeping feeling and tremulous motion in the limbs, an immediate fever, and a profuſe perſpiration. Next day, at the hour of dreſſing, when the bandages were undone, a new and inflamed ſwelling covered all the left ſide of the forehead, while a bloody ichor flowed from the original tumor. Diſcutient medicines were applied to the former, to the latter turpentines and mell roſarum. But he was

paſt help; for, along with a continual inquietude and toſſing of the body, there was a delirium which the moſt powerful medicines could not appeaſe. Next day, we found our patient lying extended, with his eyes cloſed, his lips livid, and all the ſigns of approaching death. We hardly dared to raiſe him to have the ſore dreſſed; and hardly was this laſt office performed, when his limbs quivered, and he expired *." The diſſection reſembles the others of fungus of the brain.

* " Vir procerioris ſtaturæ atque habitus corporis athletici, potentiſſimi Regis Boruſſiæ militiæ adſcriptus, triginta circiter et quatuor annos habens, non minus ſtrenuus in caſtris Veneris miles, inde etiam conſueta hujus militiæ præmia retulerat, cumque mala inde percepta aliquantum ſopita potius quam penitus e corpore ſublata eſſent, tandem fatalem illum morbum, quo e vivis ſublatus eſt, contraxerat. Siquidem corpore impuris ſuccis ſcatente caſtra ſequi tenebatur, in quibus, præter victus inevitabilem ataxiam, variaſque aeris injurias ac viciſſitudines, ſæpius in locis udis ac paludoſis requieſcere, ſomnumque capere coactus fuit, corpore, et imprimis capite, non ſatis ſemper tecto atque munito. Unde factum, ut tumorem in latere capitis ſiniſtro perciperet, initio vix nucem juglandem magnitudine excedentem, at temporis progreſſu tantam in molem excreſcentem, ut non tantum os bregmatis ſiniſtrum fere totum, ſed et partem oſſis bregmatis dextri, ultra futuram ſagittalem occuparet, pugnique magnitudinem æquaret, cujus faciem prout exterius apparebat Fig. I. repreſentare ſtuduimus. Licet æger nullum præter gravativum quendam capitis ſub initium ſentiret dolorem, tamen pejora metuens, medelam creſcentis in dies mali circumſpicere cœpit, cumque medici et chirurgi caſtrenſes, poſt varia incaſſum tentata, infauſta quæque ominarentur, et triſtiſſima eum deſererent prognoſi, Helmſtadium noſtrum, ejuſque decus immortale, Ill. D. Conſiliar. Aul. HEISTERUM, patronum, hoſpitem, et præceptorem meum ad urnam uſque colendum adibat, ejuſque non tantum conſilium, ſed et auxilium, ſi poſſibile foret, implorabat. Hic re uti ſolet curatius explorata atque perpenſa, dum tumor perquam durus ac immobilis fere erat, atque alios fere ſimiles jam alias ſcalpello curaverat, nullam aliam præter operationem manualem ſupereſſe opem pronuntiavit, nec tamen certum ipſi polliceri poſſe auxilium, dum, quam profunde deſcendat, et quomodo forte cranium imo ipſum cerebrum læſerit, perſpici non poſſet, præſertim cum jam ſæpius ſenſus ſibi haud leviter turbari conqueſtus fuerit, ſed caſum hunc eſſe ejuſmodi, de quibus Celſus ſcripſit, Melius eſſe experiri remedium anceps, quam nullum. Cum itaque ægrotus recuperandæ valetudinis deſiderio ad ſubeundam eam animum confirmaſſet, præparato convenientibus remediis corpore, horis matutinis fruſtulum lapidis cauſtici, quo Ill. D. Heiſterus ſæpius ad omnis generis tumores aperiendos utitur, qui ex calce viva et ſale alcalino paratus erat, ad aperiendum et hunc tumorem imponebatur. Verum enim vero tribus vix elapſis horis largum, ut videbatur ex vaſis cutis ſanguiferis, inſequebatur cruoris profluvium, quod tamen cum linamentis et ſpiritu vini rectificatiſſimo ſuperimpoſitis rurſus compeſceretur, æger bene ſe habebat, et vires admodum conſtabant. Circa veſperam ejuſdem diei, tumore a faſciis, ſpleniis, ac emplaſtro, quod cauſticum ſuis coercebat limitibus, denudato, et quantum circumſtantiæ poſtulabant dilatato, ob hæmorrhagiam iterum mox deligabatur. Vinctura ſatis iterum firmata nihil equidem incommodi ſentiebat, hinc nimis audax in eo haud levem æger admittebat errorem, quod corpus, inſcio et invito ſuo medico, externo frigidiuſculo nimium expoſuerit aeri, et per binas integras horas in area domus, rudibus tunc temporis ventis undique pervia, ſteterit atque ambulaverit; unde factum, ut brevi poſt horrore, ac poſtea membrorum omnium laſſitudine, extremarum partium horripilatione, motuque contremiſcente, poſtque aliquot horas æſtu ac pulſu febrili, ſudore deinde largo per univerſum corpus prorumpente corriperetur, quæ febris, ordinatis licet convenientibus remediis,

This is the awful ſcene in which the ſurgeon is involved, when he puts a raſh hand to ſuch a tumor; this the tragical and bloody cloſe of that ſcene, in which he unwaringly makes himſelf an actor. It was not owing to the "rude winds" that this unhappy perſon died before his time, and in greater torments, but to an ill-founded hope, or weak compliance, on the part of this truly celebrated man, whoſe miſtake will ſerve you, I truſt, as a memorable warning. This leſſon I have repeated in ſtrong, and, I hope, perſuaſive terms. Every new diſaſter muſt ſeem more lamentable, every new offence againſt the rules of good ſenſe and prudence more culpable. You will lament to ſee men of education and ſkill, men charged with the high reſponſibility of public duties; men like Heiſter, (men whoſe years and learning, whoſe ſelf-reſpect and ſelf-command, ſhould forbid them from making experiments even on thoſe who hold the remains of life by the ſhorteſt tenure), imbruing their hands in blood, and performing operations ſo cruel and ſo hopeleſs, as to bring only diſgrace upon our ſcience. Although the ſigns of this kind of danger are far from equivocal, ſuch things have been done from time to time, and the offence is repeated, although Parée, nearly three hundred years ago, deprecated ſuch raſhneſs, and cloſed juſt ſuch a narrative as that which I have juſt recited with theſe memorable words: "J'ai bien volu recitte cette hiſtoire afin d'avertir le jeun chirurgien de ne faire ouverture a la tete en ſemblables tumeurs." So many fatal miſtakes, ſo many patients directly put to death (though really dying) by the hands of the ſurgeon, is ſufficient to give importance, not to this deſcription of tumor only, but to every thing which reſembles it.

Let theſe facts, then, ſtand to you in place of experience. Examine, with a ſcrupulous and jealous preciſion, into the hiſtory of all tumors ſeated on the head. Regard as ſuſpicious thoſe which are connected with venereal affections, with blows, or falls, or concuſſions of the head. Regard as peculiarly dangerous, all tumors of

illum per totum morbi decurſum non deferebat. Poſtridie, cum Ill. D. Heiſterus, comitantibus ipſum compluribus medicinæ ſtudioſis, quibus et ego ſemper interfui, ægrotum renovandæ deligationis cauſa viſitaret, novus apparebat tumor inflammatorius, qui totum os frontis lateris ſiniſtri uſque ad oculi ſiniſtri palpebram occupabat, cui diſcutiendo accommodatum epithema imponebatur; antiquo vero tumori, ex quo remotis faſciis ichor cruentis effluebat, unguentum ex terebinthina et melle roſarum applicabatur, interim vires frangebantur, et cum inquieta corporis jactatione, etiam delirium, quod, non obſtantibus remediis præſtantiſſimis, augebatur, accedebat. Cum ſequenti die accederemus, ægrotum oculis clauſis et labiis lividis moribundo ſimilem deprehendebamus, ut non niſi difficulter ad novam excitari poſſet deligationem. Qua péracta, aliquamdiu poſt, convulſiones utriuſque pedis accedebant, tandemque circa meridiem viribus penitus, fractis miſeram mortalium cum vi a feliciori commutabat. Cadaver poſtea ab Excell. Dom. Præſide diſſectum ſequentia obtulit phænomena," &c.

ſlow growth, of deep pulſation, receding within the cranium, covered with puffy ſcalp, and cauſing, upon being repreſſed, not pain, but ſickneſs, confuſion of head, convulſions, and tremblings of the limbs. When the ſcull is firſt deſtroyed, and the brain, or the internal tumor protrudes, a temporary relief ſometimes enſues. Occaſional eaſe is ſometimes procured by gentle preſſure, and equable ſupport, but the event is inevitably fatal; and frequent ſwoonings, inſenſibility, coma, or quivering of the limbs, an involuntary diſcharge of urine and fœces, delirium, and convulſion, cloſe the ſcene. Touch no ſuch tumor, at the peril of your reputation; for, it is either a caries of the cranium, through which the brain protrudes, or an aneuriſm from without, or a fungus from within, which has deſtroyed the bone *.

* That my reader may be ignorant of none of the authorities nor precedents, and unacquainted with none of the horrid forms or ſymptoms of this diſeaſe, I have been at pains to tranſlate the following caſes:

" A healthy young woman, of eighteen years of age, fell down the ſteps of a cellar from the top to the bottom. She lay ſenſeleſs for an hour; and, upon reviving, was aſtoniſhed to find herſelf laid in bed, having not the ſlighteſt recollection of what had happened. The contuſion of the integuments, merely over the back-part of the parietal bone, was too ſlight to require attention; but, during all that year, ſhe had, from time to time, vomiting and ſickneſs; and for twenty-nine years after, ſhe was afflicted with miſerable pains within the head, aggravated always during the heat of ſummer.

" At the end of the twenty-nine years, in going behind a loaded carriage, it being ſuddenly overturned, ſhe received a blow exactly upon the ſpot injured twenty-nine years ago. She fainted, and lay inſenſible a full quarter of an hour, and they thought they could perceive at this time a dimpling of the bone. Bleeding relieved the pains of the head, and, when they returned from time to time, repeated V. S. procured a temporary relief.

" It was about a year after, on Palm Sunday, there appeared ſuddenly a tumor, the ſize of a ſmall hen's egg. She was at church, but when ſhe returned the moſt portentous ſymptoms began; vomiting, with continual hiccup, with cold extremities, and trembling pulſe, and every ſign of immediate danger.

" The ſurgeon of the inſtitution would have opened the tumor, ſeated ſo expreſsly as this was, on the place where the patient had felt the ſettled pains ſo many years. Yet he did not chooſe to proceed in it without advice. Having called in Mr Mazeux, he was by no means of the ſame opinion. He felt a tumor ſoft, but without fluctuation, and with a pulſation perceivable both to the eye and to the touch. They bled her in the ankle, and deferred till the morrow taking any deciſive ſtep, when they could have the advice of other phyſicians and ſurgeons.

" She paſſed a terrible night, and ſtill the bad ſymptoms continued; ſhe had faintings and cold ſweats, ſo that they deſpaired of her life. She received the laſt ſacrament; and it chanced, that while the offices of religion were performing, ſhe lay on the ſide oppoſite to the tumor; and while ſhe lay in this poſture, the ſymptoms relented, the tumor itſelf diſappeared, and with it all the forerunners of diſſolution. The patient believed herſelf cured by miracle; and, when the profeſſional gentlemen met at the hour of conſultation, in place of a creature on the brink of the grave, as their patient had been deſcribed to them, they found a woman in high ſpirits and

Let us now return to reflect on one indiſputable fact, and it is this: Within the proper ſtructure of the ſcull, the circulation is ſo vigorous, and its ſources of

health, quite gay; and, upon examining the head, they found, in place of the tumor, a hollow, with manifeſt loſs of ſubſtance in the parietal bone, and the circle could be traced, by preſſing in the ſound integuments which covered the hollow, which was of the ſize of a half-crown.

To prevent accidents, and defend the part, they made this woman wear a ſtuffed and quilted bonnet, piqued, and in which a ſmall tin-plate was ſewed over the injured part. But, in ſpite of every precaution, the tumor appeared again from time to time, with all its dangerous train of ſymptoms. But poſture and reſt always prevented danger.

About that period, when the menſes are about to ceaſe, the patient was careful to have herſelf bled alternately in the arm and in the ankle every three months. Finally, at the end of the ninth year from the riſing of the tumor, on the 16th of April 1749, ſhe was attacked with a diarrhœa, ſlight indeed, but which did not ceaſe, when, about three in the morning, the headachs, vomiting, and hiccup, brought her again into extreme danger. At three in the afternoon ſhe fainted, and lay as if dead for three hours, during which ſhe had large involuntary evacuations of fæces. She then recovered her ſenſes, but expired in leſs than an hour after, at the age of fifty-five years.

No one opened her head; it was five years after Mr Robin found means to procure the ſcull. The right parietal bone, at the place where ſhe had received the two blows, was perforated with a hole no leſs than ſix inches in circumference. The inner table, more widely eroded, formed a rough irregular border, while the tumor, corrupting the bone from within outwards and irregularly, ſo that, in the margins of the great hole, there was a ſcore of leſſer perforations, ſmaller and larger, while at other points the bony circle was tranſparent, and ready to burſt out into holes.

My reaſon for inſerting thoſe caſes in foot-notes, my reader will eaſily divine; it is as a reſource in difficult conſultations, and as a full diſplay of ſymptoms.

CASE BY MR MARIGUES.

"A woman about fifty years of age, of a leuco-phlegmatic habit, had been ſubject, for thirty years, to violent epileptic paroxyſms, which was attributed at firſt to a fright. Being attacked with a cattarh, ſhe felt, in every paroxyſm of coughing, a very acute pain under the upper part of the occipital bone, which made her often lay her hand upon the part, as if to give her eaſe. Troches, &c. cured her cough; and it was remarkable, that while this complaint continued, ſhe had not once ſuffered an epileptic attack. About a month after this, ſhe was ſuddenly attacked with epilepſy while ſitting. She inſtantly dropped from her chair, and ſtruck the floor with her head upon that very ſpot where the cough was wont to excite the pain, and from that moment ſhe was never free from ſuffering. About ſix weeks after the fall, ſhe obſerved a ſmall lump, the ſize of a walnut, riſing on that part, and conſulted a ſurgeon about this loup, as ſhe imagined it. He perceived all the ſuſpicious ſigns, he was ſenſible both of the pulſation, ſynchronous with that of the wriſt, and of the tumor being ſurrounded by the circular borders of the occipital bone, through which it projected. He pronounced it a hernia cerebri, and chiefly for this reaſon, that upon preſſing the tumor, it receded within the

blood ſo varied, that the bone by no means depends on any one ſet veſſels for nouriſhment, nor even on that which ſeems the moſt eſſential to its health, the dura mater! The

cranium, and upon raiſing the finger, it roſe again, the pulſation being manifeſt to the eye, as well as to the touch.

" It was a caſe too intereſting to be meddled with without a conſultation. Two other gentlemen viſited along with him. The tumor being repreſſed entirely within the bony circle, a ſwooning came over the patient, and laſted while the preſſure was continued. When the tumor was not puſhed entirely within, there was nothing of this ſwooning; but every time the entire reduction of the tumor was repeated, her ſenſes forſook her, the eyes reeled, and there was a ringing of the ears, and her limbs became powerleſs, the pulſe died away; and it was very remarkable, that the patient, in place of ſuffering by thoſe experiments, was relieved of the dreadful pains in her head, the moment the tumor was preſſed back from the inner ſurface of the bony circle.

" This relief they have attributed to the preſſing back of the tumor, ſo as to prevent it reſting againſt the inner ſurface of the ragged circle of bone. I attribute it to that natural and gentle ſupport which the brain ſhould have from without, and the want of which fills the head with blood, cauſing thoſe convulſions and pains.

" Mr Marigues could not believe that the bone, without any previous ſwelling or inflammation, could be deſtroyed by this blow; nor could he believe the ſoft ſubſtance of the brain capable of forming ſo firm a tumor; he could not therefore admit the idea of a hernia cerebri.

" Whatever was the nature of the tumor, certain it was, that the woman was relieved by gentle and uniform preſſure; (N. B. Theſe are the words of the paper, and it is, indeed, a very remarkable fact); though a violent preſſure diſturbed the functions, a gentle one gave her relief."—Vid. Mem. de Chirurgie, p. 26.

" The patient ſoon wearied of the bandage; the pains returned, cardialgia came on, and they perceived that her memory began to fail. The tumor increaſed in ſize one third, the ſtate of the patient was very afflicting; any bright light, or luminous object, excited the moſt extreme pain. The examination of the tumor being renewed, there was now no difference of opinion among the conſultants, all agreed that the tumor was of a ſchirrous and fungous nature, and that its roots lay within the ſcull; and they ſaid, the only chance of relief was to make a crucial inciſion in the integuments, and apply two or three crowns of the trepan round the opening of the bone to enlarge it, and treat the fungus according to its nature. But this was an operation to which the patient would not conſent.

" A few days after this conſultation, ſhe complained firſt of a pain in her right arm, and then it became powerleſs; next, the lower extremities were ſeized firſt with pain, and then with paralyſis. The pains of the head required that bleedings and anodynes ſhould be again adminiſtered. She lived on till October, when her friends gave her entirely into the hands of the phyſicians, who applied various cataplaſms and fomentations, bliſters under the knees, and cephalic tinctures to the noſtrils. Theſe were almoſt as certain ſigns of approaching death as the ſymptoms themſelves. She died on the 23d of October, about ſeven months after the commencement of that catarrh, with which the more deſperate ſymptoms began.

" On opening the head next day, the integuments and pericranium were ſound, and without the ſmalleſt adheſion to the tumor: which want of adheſion is another conſequence of this diſorganiſing preſſure. The tumor was of a fungous ſubſtance, and ſeemed to be generated in the ſubſtance of the dura mater; its baſe was broader than its projecting part, whence it was in ſome degree ſtrangled by the embracing of the bony circle. The opening in the ſcull, of an oval form, was hardly an inch and a half in its ſhort diameter, or two inches in its longeſt. The roughneſs along the line of the longitudinal ſinus, under the ſagittal ſuture, proved that there

whole of the dura mater may be ſeparated from the internal ſurface of the ſcull, and yet the union be reſtored. We often, upon applying the trepan, perceive that the oppreſſion of the vital powers proceeds from an effuſion of blood under the ſcull, compreſſing the brain. The blood is hooked out with probes, waſhed away with mild injections; diluted by the natural ſecretions, and by the purulent diſcharge from the ſuppurating ſurfaces of the dura mater and ſcull; and the clotted blood being thus diſſolved and diſcharged, the ſurfaces unite again. We are often perſuaded, by the quantity of the extravaſated blood, that it muſt have covered the whole hemiſphere of the brain, up to the ſagittal ſuture. We ſometimes feel the extent of the ſeparation, by introducing the probe; but we ſeldom have ſo clear a conviction, as in the following caſe of the whole extent of the dura mater,—of the whole internal perioſteum of the ſcull being detached. "A young man, of about thirty years of age, was ſtruck repeatedly on the head with a crab-ſtick, and with a loaded whip. Next morning, he was found lying in a ſtate of profound lethargy, and with his right ſide paralyſed, but without the ſlighteſt appearance of fracture, or depreſſion of the ſcull. The marks of the blows being chiefly on the right ſide, that ſide (contrary to a well-eſtabliſhed rule) was firſt trepanned, and the dura mater was found diſengaged to ſuch an extent, as to contain, at leaſt, ſix or ſeven ounces of blood, betwixt it and the ſcull.

"This firſt perforation gave him ſome reſpite, but his friends reſiſted all further attempts to relieve him, till four days had elapſed, when there appeared no longer any hopes of life, and he was left to die among the ſurgeon's hands. Then the left parietal bone was trepanned. The whole hemiſphere of the brain was ſeen to be ſurpriſingly compreſſed by a thick black cake of coagulated blood, of the conſiſtence and colour of currant-jelly. The cake of blood extended actually from the falx, or ſagittal ſuture, to the bottom of the os petroſum; in ſhort, from the vertex to the baſe of the ſcull; and ſeemed to conſiſt of the ſame quantity that was diſcharged from the other ſide, amounting, of courſe, to ſix or ſeven ounces of blood. Although it was not thought prudent to bring away at once the whole maſs, yet, ſo much was diſcharged, that, upon ſpeaking to the patient, he inſtantly looked up, like one awakened from ſleep, named every one, and raiſed the arm which had been paralytic over his head; and much of the coagulum being removed, he recovered apace, ſo as to be able, by the fifteenth, to walk into an adjoining room; but by the

the dura mater had become unnaturally vaſcular, and had begun to aſſume the diſpoſition to diſeaſe. The inward projection of the tumor was lodged in a hollow of the left hemiſphere of the brain."

accidental burſting out of an artery in the ſcalp, he was weakened, the confuſion of head, and even the paralyſis, in ſome degree returned.

" Some days after this, his friends, deſpairing of his life, laid him on a litter, and, without acquainting his ſurgeons, (Mr Hill, and Dr Gilchriſt, of Dumfries), carried him home, a journey of eight miles. The left ſide of the brain ſuppurated five or ſix times, each paroxyſm of inflammation being accompanied with fever, ſtupor, and difficult deglutition, and relieved by an eruption of matter; and it was remarked, that when ſuch ſuppuration formed towards the fore-part of the brain, the candle appeared to the patient double; but when the ſuppuration was backwards, the light appeared to have a halos, or circle, round it; and after each eruption of matter, the candle appeared ſingle and diſtinct. Notwithſtanding theſe occaſional interruptions, he was, in three months, completely cured; became the father of a family, and lived long in perfect health, excepting a ſlight defect of memory, and ſlight convulſive twitches, to which he continued ſubject."

In this moſt intereſting caſe, related by Mr Hill, he had taken every pains to aſcertain the extent of the ſeparation. He found no apology for introducing his probe under the ſcull, on the right ſide, becauſe the blood flowed freely out; but, on the left ſide, his probe, while hooking out the coagulated blood, paſſed from the trepan-hole, in the centre of the parietal, downwards, along the temporal bone, till it was ſtopped by the curvature of the os petroſum, and upwards again by the lambdoidal ſuture, all along the ſagittal ſuture, and over the orbit, along the frontal bone; and it is my perſuaſion, (ſays Mr Hill), that the ſeparation of the dura mater was not leſs extenſive over the right ſide.

What, then, are we to infer from theſe phenomena? Surely this: That, as lacerated ſcalp adheres readily with the external ſurface, the dura mater has an equal aptitude to re-unite with the internal ſurface of the ſcull; and theſe phenomena preſent themſelves daily to the obſervation of the practical ſurgeon. He preſumes, from the ſudden oppreſſion of his patient's ſenſes, and the palſy of his limbs, that the dura mater is ſeparated, by a ſhock, or blow, not ſlightly, ſo as merely to endanger ſuppuration, but to ſuch extent as to cauſe a great effuſion of blood from all its veſſels. He trepans the ſcull, and by the general preſſure, and riſing of the brain, the blood is (as I have generally obſerved it) ſpued up in grumous clots, through the trepan-hole. He puts in his finger,—turns it round,—feels no ſolid reſiſtance, and is conſcious that the dura mater is much depreſſed, and the effuſion of great extent. Sometimes he finds a cake of ſolid and firm coagulum, which bears the preſſure of

the finger. At each dreſſing, he introduces his probe, binds it, and turns it in every direction; by injections of tepid water,—by the help of the probe,—by the purulent ſecretion from the ſurface of the ſcull, and dura mater, the blood is gradually diſcharged, and by every mark it is certain, that the extravaſation has exuded under the whole of one parietal bone, from the forehead to the occiput, and ſometimes from ear to ear. Yet, by the ſecretion of pus, and by the heaving of the brain, the blood is entirely diſcharged, and purged away. The ſcull and dura mater are in a ſtate of ſuppuration by the time they are allowed to approach each other. The dura mater is covered with a velvet-like pile of granulation. The margins of the trepan-hole, and (by inference) the internal ſurface of the ſcull, is covered with a ſimilar pile of granulating fleſh. The dura mater is, by the preſſure of the brain, ſupported in cloſe contact with the ſcull, and the ſurfaces are united, and the trepan-hole cloſed by a proceſs of nature, viſible to the ſurgeon, in every ſtage, and expreſsly reſembling the re-union of ſoft parts.

Thus, we are ſenſible, by daily proofs, that the dura mater, which ſometimes is ſlightly ſeparated, and inſenſibly re-united, (the blood effuſed betwixt the bone and the membrane becoming animaliſed); which ſometimes, after ſuch ſeparation, heals apace, and forms fungi; which moſt frequently of all ſuppurates, and affects the brain; has yet in all caſes a tendency to re-unite with the ſcull, ſo marked and particular, that wherever it does ſuppurate, and prove fatal, it is from one of theſe two cauſes:—either, the effuſion of blood is of ſuch extent, as to hinder the re-union by its interpoſition, as a foreign body, and to oppreſs the brain by its preſſure; or, the bone itſelf has received ſome irreparable injury, has its internal organization deranged by the blow, is no longer alive, nor capable of maintaining its union with living parts.

I know no fitter term to deſignate this affection of the bone, than that of Contusio Cranii, a term calculated to expreſs our perfect belief of the fact, without affecting to define the injury which a bone ſuſtains, when deadened by a blow. But, though we have it in our power to prove on many occaſions, a pure and ſimple contuſion, an affection peculiar to the bone, although it is of importance towards underſtanding all the cervicles of cauſes of danger, that we inveſtigate this particular cauſe ſimply; yet, we have reaſon alſo to believe, that every fatal caſe is of a complicated nature, and that uſually the dura mater is ſeparated, and the integuments injured, when the bone is contuſed; hence the immediate ſuppuration, the external tumor, the ſudden fate of the patient.

We are now called to inveſtigate the nature of this injury, and its conſequences. The phenomena which follow the death of the bone,—the ſlow ſucceſſion, in which the worſt ſymptoms appear,—the inſidious nature of thoſe ſigns which intimate to us that the brain is affected, and which, being overlooked, are ſo invariably fatal. So difficult is it to diſtinguiſh when your patient has fallen into a ſtate of danger, that, as Sterne ſays, when ſpeaking of thoſe glimmerings of intellect, which a careful obſerver may diſcover, among the inhabitants of the northern regions, "You muſt hold your hand over your eyes, and look hard and ſtedfaſtly at the patient, if you would obſerve and anticipate the firſt ſlight ſigns of danger."

OF CONTUSIO CRANII.

THE eſſential change produced in the injured part of the cranium by a blow, or contuſion, I have not ventured to define, but ſhall proceed to explain its conſequences, by an analogy, in point of fact the moſt remote, though in philoſophical principle expreſsly the ſame. "Jack Barnes, a fine, active, and ſpirited boy, not yet old enough to enter into ſervice, but able to breed dogs, and take care of horſes; being very adventurous and fearleſs, he had often horſes run away with him, and got many hard knocks, but was never hurt. He was a comely, freſh, and healthy lad, of about fourteen years of age, and had ſixteen brothers and ſiſters, all healthy, the elder lads ſerving in the militia, and the elder girls with the farmers round, when the following accident happened to him:

"He was in harveſt-time driving home a ſingle-horſe cart, and having thrown the halter careleſsly on the horſe's neck, he was afraid, in paſſing quickly through a park-gate, that the wheel would touch, and the cart be overturned. He ſtopped to catch the bridle, loſt his balance, and fell under the cart, the wheel running obliquely over his leg, ſo as to bruiſe the whole length of the tibia, from the ankle to the knee, but without tearing the ſkin. He walked home very lame, complained much during the night. The limb was livid next morning from ecchymoſis; which livid colour changed gradually, as uſually, to green and yellow, and by the

time the colour had vaniſhed, *i. e.* in about a week, he recovered from the lameneſs, and was ſo entirely well, that he almoſt forgot the accident, felt hardly any pain, and continued well for four months.

" At the end of that time, his health went altogether wrong. He was ſeized with a fever, without any particular tendency, or any obvious cauſe. He was obſerved by his mother to be dejected, drooping, and ſpiritleſs. He had loſt his colour and appetite, he had pains in the head, and in all the bones, with feveriſh nights, and uneaſy dreams; and, on the fourth day, having walked out two miles, to meet his mother, and help her in carrying home a burden of fruit, he came up with her very lame of that leg which had been hurt, and limping with the help of a ſtick which he had picked up in his way. His mother got him home with difficulty, in extreme pain. His leg was not at all ſwelled before he went to bed; but he lay tortured with pains, which his mother tried to ſoothe, by riſing from time to time, and rubbing his leg with the palm of her hand. At times he felt relief, but all night long he cried with the extreme pain; and when the morning came, his leg was found greatly ſwelled. The ſwelling continued increaſing for a week; for many nights he was in great anguiſh, was exhauſted with fever; his appetite entirely left him, and he was extremely weak.

" The character of this ſwelling was very peculiar; it was limited to the line of the tibia, the joints of the knee and ankle being free, or almoſt free, from ſwelling or pain. This ſwelling, which covered all the ſhaft of the tibia, formed in one night, but continued increaſing for eight days. It was firm, ſolid, and deep-ſeated. The ſkin was not at all reddened; the pain was in the centre of the leg, in the bone; the tumor continued very hard, firm, and full, for three weeks, and reddened towards the ſurface only a few days before it burſt. During theſe three weeks of pain and ſwelling, leeches, poultices, fomentations, &c. were uſed without effect.

" About a month after the firſt attack of the pain and fever, the ſwelling burſt near the ankle, and diſcharged about half a pound of matter, with much relief; but a month more elapſed before he could riſe from bed, or have his leg carried before him, and laid on a pillow; and when he was raiſed out of bed, he was pale and emaciated. He lived on milk and fruits, (his parents made their bread by ſelling fruit); he had the beſt diet theſe poor people could give him; he had daily a little wine too. They had crutches for him, and he began to drag his leg along; and they got him out to the door, and ſeated him in the ſun at midday. From time to time a new attack of fever, with rigors, came on, the pains in

the centre of the limb, in the body of the ſhin-bone, returned. One part of the leg, after another, became red and livid; and the matter, after working within for a fortnight, or three weeks, burſt out, and along with each diſcharge of matter, there came away a portion of the tibia. He picks out each piece of the bone with a ſmall ſilver fruit-knife, which he keeps on purpoſe. Each exfoliation of bone is preceded by a pricking pain, when the exfoliating piece of bone reaches the ſenſible parts of the ſkin; and the phenomena are ſo regular, that he knows well when abſceſs is forming, when a piece of bone is to be diſengaged, and when he is to have relief. He picks each fragment out through its hole, as he would do a thorn from the fleſh. He has picked away forty pieces, ſome of them ſeveral inches long.

"The proceſs is now almoſt complete. Pieces equal to the whole ſhaft of the tibia have been diſcharged through various openings. The ſoft parts ſurrounding the tibia have, during this ſlow exfoliation, formed a new bone; the old bone is diſcharged; the new bone, formed upon its model, and by the ſecretion of its perioſteum, is bigger; of courſe the limb is enlarged, but it is ſound and ſtrong, and in this boy will ſoon be able to bear freely the weight of his body; but as this is a proceſs which is delayed by various obſtacles, we can never ſee when it is completed; it laſts often for years."

Thus you perceive, that it is not in the head only that we aſcribe the death of the bone to a blow. The phenomena I have juſt deſcribed, are thoſe of necroſis; and necroſis (a term applied indifferently by the ancients to the gangrene or death of a part, or of the whole) is juſt the death and diſcharge of bone; and ſince bone is every where the ſame in conſtitution, and internal ſtructure, its death muſt be accompanied with the ſame phenomena in all parts of the body. Theſe ariſe either from the peculiar organization of bone, or from the nature of its connection with the ſurrounding parts. From the peculiar ſtructure of bone, from its firmneſs, and want of ſenſibility, the ſhock which deſtroys it is not ſenſibly felt, its death is not marked by immediate ſymptoms. It may die, and yet continue to preſerve its place, and occupy the very centre of a limb, as a carious and dead tooth occupies its ſocket, without producing abſceſs or pain. From the peculiar connection of the ſoft parts with the ſhaft of a bone, the period of ſeparation is accompanied with pain, abſceſs, fever. The ſeparation is long and tedious, and the ſoft parts, which are ſtill alive, ſecrete new bone, which ſometimes ſimply replaces that which is diſcharged,—ſometimes actually ſurrounds and incloſes the dead bone.

The ſtimulus of the dead excites the action of the living parts. The ſecretion of new bone is proportioned to that which is deſtroyed, and in proportion as the ſhaft of the old bone is weakened by exfoliations, the bone generated by the ſurrounding parts comes to replace it, and is waxing ſtrong, and the boy, (for it is a diſeaſe only of boys, of growing boys, of boys whoſe bones are not yet formed), never for a moment, unleſs it be from pain, or fever, and weakneſs, loſes the uſe of the limb, but walks ſtoutly, while the original ſhaft of the tibia, or thigh-bone, is wholly diſcharged, and replaced by a new formed bone.

Such analogies as theſe are uſeful in delineating the phenomena of contuſed bone. They are neceſſary towards rendering credible one of the moſt certain truths in pathology, viz. That where a bone is deadened by a blow, the ſymptoms are often delayed for months or years; and the phenomena are ſimilar, whether it be a carious tooth,—a necroſing tibia,—or a contuſion of the ſcull. Nor ſhould we be ſurpriſed to ſee this decided death of the bone, or this long train of ſymptoms, ariſe from a bruiſe; or wonder that the internal ſtructure of bone ſhould be thus affected without fracture; for I have ſeen a boy's leg bent under a cart-wheel, and gradually reſtored, or almoſt reſtored, to its natural ſhape, by the natural growth of the bone: and not many months ago, had under my care a young gentleman, who being on horſeback, and riding hard in a dark night, ſtruck the ſhaft of a cart with ſuch violence, that he and his horſe were overturned; he was carried home, lay in bed for eight days in extreme agony; had the whole leg livid, and ſwelled to the ſize of his thigh; and though it unqueſtionably was not broken,—though he kept his bed only eight days, and moved it all the while,—though he ſoon walked into the dining-room, with the help of a ſtick, and all along reſted his weight in ſome degree upon the limb, a ſure proof that it was not broken,—had yet received ſo violent a ſhock, that being very young, and the bones growing, the tibia, at the place where it was ſtruck, about four inches below the knee, was bent, and manifeſtly deformed.

Theſe are the phenomena which I am about to examplify in the ſcull, with this eſſential difference, that the ſimple phenomena of contuſed bone are complicated with affections of the brain. In contuſions of the tibia, or ulna, the pain, the fever, the profuſe ſuppuration, may exhauſt the patient; but it is only when the contuſed bone is deſtined to defend viſcera eſſential to life, that life is endangered.

"A trooper (ſays Petit) was ſtruck by a piſtol-ball, which grazed the middle of the ſternum obliquely,—made a ſmall wound,—laid bare the outer table of the bone, without depreſſing it; and the ball, being thus turned aſide, did not penetrate, but

paſſed out, and was found in the breaſt of his ſhirt. So little was he ſenſible of the injury, that after having a compreſs, dipped in ſpirits, applied to the wound, he mounted again, and rode into the field, where the battle laſted an hour. Upon his return to the camp, his ſurgeon, though he agreed with him that the wound was ſlight, aſſured him that it muſt be dilated, and the bone laid bare. He ſaid, he knew they could cure him by compreſſes ſoaked in arquabuſade water; yet he ſubmitted to confinement, and a ſevere diet, and to the being bled in the arm. Till the fifth day, he was highly pleaſed with his own wiſe councils, but he began then to feel a ſlight difficulty of breathing, and a heavy pain in all the fore-part of the thorax. The hurt part became red, and tumid in all its circumference, and black in the centre. Then he conſented willingly to their doing with him whatever they pleaſed. A large crucial inciſion was made upon the part. He was repeatedly bled; the pains ceaſed, the ſuppuration became healthy. The bone exfoliated, though it required a long while, and he was thus cured *."

The blow, which in this caſe had not depreſſed the outer table, had yet contuſed the bone, ſince the ball could not be thus turned aſide without the bone receiving obliquely the force of the ball. This trooper began to feel that oppreſſion which in ſuch caſes precedes the ſuppuration beneath the ſternum, proceeding like that beneath the cranium, from the death of the ſcull. He was reſcued from the imminent danger of death and ſuffocation †; and this contuſion of the bone, which brings oppreſſion and difficulty of breathing, when the ſternum is injured, brings delirium, coma, and convulſion, in a ſimilar injury of the ſcull.

* Petit.

† That my reader may underſtand this kind of danger, that he may know the manner an abſceſs forms under the ſternum, in conſequence of ſuch contuſion of the bone, I have tranſcribed the following caſe from Petit: "Un ſoldat eut une pareille plaie qui parut légere à ſon chirurgien. Il ne daigna pas y faire une inciſion; il ſe contenta de la panſer avec le digeſtif, il ne paroiſſoit point d'accidens; il ne faigna ſon bleſſé qu'une fois ou deux, et le laiſſa maitre de ſon régime; la plaie ſuppura. Cependant les chairs covrirent l'os, et ſemblerent ſe diſpoſer à la cicatrice. Le bleſſé quitta ſon hopital, et retourna à ſa troupe, ou peu de jours après il tomba malade d'une fievre, qu'on attribua à ſon mauvais régime. On combattit cette fievre pendant quelques jours ſans faire attention à ſa plaie, qui effectivement à la voir, paroiſſoit n'avoir aucune part a la fievre: on l'envoya à l'hopital de Mons, ou j'etois alors; il me raconta tout ce que je viens de dire: j'examinai ſa plaie; j'y portai la ſonde, et je trouvai l'os découvert: la fiévre étoit mediocre, mais il avoit dans la journée pluſieurs friſſons irréguliers. Depuis quelques jours, il ſentoit une peſanteur ſur la poitrine; quand il buvoit il perdoit haleine, ne pouvoit touſſer ſans doleur, et, après la toux, il etoit quelque temps à alleter; comme quand on a fait une longue courſe. Je ſoupçonnai quelque ſuppuration ſous le ſternum, ou dans le diploé de cet os. J'avertis M. Renault, alors chirurgien-major

There can be no more ſure and unexceptionable proof of contuſion of the ſcull, than that which happens from the grazing of a ball. A muſket-ball communicates no heavy ſhock by which the dura mater may be ſhaken, but is the moſt deſtructive blow to the bone, which being ſtruck obliquely, turns the ball aſide, and receives its whole force, has its internal ſtructure, or living powers deranged, or injured, and blackens ſoon, and exfoliates ſlowly, and ſometimes terminates in a mere caries, but much oftener in a fatal ſuppuration of the dura mater and brain. I need not ſeek to impoſe upon you the authority of reſpected names, to confirm a theory which, before I conclude, ſhall be variouſly and inconteſtibly proved; but remark it rather as a proof of the ingenuity and good ſenſe of Botallus, that he underſtood ſo well the invariable effect of a ball, in deadening the bone. He regards every gunſhot wound of the head, (that where there is merely a bruiſe, as well as that where there is a fracture), as an accident requiring the trepan. He repreſents the ſlighteſt touch of a ball as a kind of contuſion, never to be neglected. He directs, that the piece ſo ſtruck ſhould be cut out with the trepan. He ſays, finally, that having ſeen ſome die, from ſuch ſlight grazing of a ball neglected, he has, invariably, found pus collected under the dura mater, directly under the injured part of the ſcull. "Aliquos etiam ſola *leviſſima illiſione a globulo* facta tum in fronte tum in aliis capitis partibus, præ negligentia tam patientium tam artificum interieſſe vidimus; quibus omnibus, recta ad os ictum pus collectum reperiebatur ſub membranis *."

dudit hopital; il penſa comme moi, il conclut qu'on découvriroit l'os et qu'on appliqueroit le trépan exfoliatif; ce qui fut fait: il en ſortit quelques matieres ſanieuſes; et quoiqu'on eut détruit tout le tiſſu ſpongieux juſqu'à la table, interne on ne crut pas avoir pénétré juſqu'au foyer qu'on ſoupçonna alors être au-delà de l'os dans la duplicature du médiaſtin. Pour s'en aſſurer, on appliqua le perforatif, et, ayant percé l'os, il ſortit du pus; mais l'ouverture n'étant pas ſuffiſante, on y appliqua une couronne de trépan avec beaucoup de precaution; il ſortit un demi-verre de pus; le malade ſe ſentit ſoulagé: enfin les panſemens réguliers et le régime le conduiſirent à une parfaite guériſon en moins d'un mois, et ſans exfoliation: il n'y a pas lieu de douter que le malade fut ſi on ne lui avoit pas fait cette operation.

* Though I am not ſure that Belloſte underſtood perfectly what I have called the contuſion of the cranium, yet it is very plain, that he underſtood well the conſequences, and how to treat the diſorder.

"A ſoldier of the regiment of Guatinois had a wound on the right-ſide of his head with a pretty large bullet, which, grazing upon the moſt convex part of the bone of the ſinciput, had only carried away the common integuments, not hurting the ſcull; but the membrane that inveſted it was ſo bruiſed, that it appeared livid. I know, if time had been given, it would have come to ſuppuration, whereupon the alteration and exfoliation of the bone muſt needs have enſued; to prevent which I tore off with my nails the pericranium; ſo far as it was bruiſed, which was ſomething more than the bigneſs of a ſhilling; and forthwith I ſtruck the uncovered bone as

The ſoldier who is ſtruck obliquely by a muſket-ball, whirls round, and falls. He lies as in a ſwoon. When he revives, he is cold, pale, with a haggard countenance, and wild and confuſed air; but he is ſoon able to get upon his feet. He is carried to a ſafe place; there is found no external wound; the integuments are livid, yet no inexperienced perſon would apprehend any danger; but he continues pale, diſpirited, and languid; in a few days, the part is puffed up, and ſlightly ſwelled. He has then ſickneſs, ſwimming in the head, cold, ſhivering, and nervous tremors; and, upon making inciſion into the part, the bone is found bare, and often diſcoloured; and if, upon the exacerbation of theſe ſymptoms, the trepan is applied, pus iſſues through the trepan-hole, and the patient is thus ſaved. "In the year 1634, at the ſiege of Ratiſbon, (ſays Freitag), a young nobleman from Hall in Saxony, ſerving as a cadet under Col. Bar, was wounded in the top of the head, at the junction of the lambdoidal and ſagittal ſutures, with a muſket-ball, which was found in his hat, and had made a ſlight wound, which his ſurgeon, contrary to all good rules of ſurgery, treated very lightly. Fortunately for this young gentleman, his ſurgeon died of the plague, and he fell into better hands; the ulcer was now broad, the lips tumid and callous, and the bone black to the centre, and completely carious. His preſent attendant, Scholtze, a ſkilful and diligent ſurgeon, was at great pains to deſtroy thoſe ſwelled and callous edges, to enlarge the whole wound, and keep the bone dry, and clear of ſanies: But the blackneſs of the bone yielding neither to inſtruments nor medicines, and ſeeing that a fleſhy excreſcence begun to protrude through the ſutures, he adviſed that I ſhould be called into conſultation; and the patient's habit being prepared, and no milder method preſenting itſelf to my imagination, I adviſed that the cranium ſhould be touched from point to point with a broad cauteriſing iron; by the help of which, aided by the natural powers, I hoped the bone might be looſened. It was in July he was wounded; in May following, the cauteries were applied. The fragment of bone firſt looſened, weighed an ounce and a half, others ſmaller weighed four or five drams. The ſmaller exfoliations, which were ſeparated from day to day, amounted to eighty-two in number, and weighed in all a quarter of a pound. A fleſhy ſubſtance ſprung up

nimbly as I could with the pyramid of the trepan, (*i. e.* the drilled holes in it, the piercer of the trepan), and then covered it with ſome lint, wet with ſpirits of wine. After two days, I took off the dreſſings, and found the bone covered with a lively red," &c. *Belloſte*, p. 85.—"In ſeven days, the bone was quite hidden with new fleſh," &c. p. 86. A ſimilar caſe, in which Belloſte drilled with the piercer where the bone was laid bare merely by a ſabre cut, and with the laſt effects. Vid. p. 87.

from the diploe, and ſurrounding bone, to cloſe the wound, and defend the brain; and in Auguſt he returned to Saxony hale and well, to the amazement of his friends *."

The danger to which this young nobleman had been expoſed, is in itſelf manifeſt; "Almoſt all the great authorities are in favour of trepanning in gun-ſhot wounds of the head, even when there is no fracture; and, indeed, experience ſeems to warrant the rule †." The danger of pus collected under a contuſed cranium will be ſeen in the caſe of the ſoldier-lad Bennet, which I am juſt going to relate to you, though I think it right firſt to ſtate to you, in a few words, one exception from the general rule.

"A ſoldier was hit by a muſket-ball on the right parietal bone. He was neither knocked down, nor apparently injured. Mr De La Combe, who firſt ſaw the patient, found the bone bare, but unhurt, and thought he might ſafely defer applying the trepan. By the twentieth day he found the bone changing colour, and imagined that the increaſing blackneſs indicated an approaching exfoliation, a ſcaling off of the diſeaſed ſurface; but was not a little ſurpriſed when, on the thirty-fifth day,

* "P. P. anno 1634, menſ. Julio in obſidione Ratiſbonenſi juvenis nobilis ex Halinis Saxonicis ſub Colonello de Barr, ex bombarda moſqueta globo plumbeo tactus in vertice, ubi ſutura ſagittalis cum lambdoide concurrit, et concentratur, globus manſit ſub pileo, et primo intuitu reliquit leve vulnus in pericranio, quod negligentius, contra Hippocratis cautelas, a chirurgo per aliquot ſeptimanas tractatum, donec chirurgus peſte extinctus, ſub autumni finem, decurſu vitæ lampada alii traderet, qui vulnus in ulcus ſordidum degeneratum, cum labiis prætumidis et duris, nec non oſſis nigredinem alte et fixe inhærentem vidit. Hic chirurgus Dominus Jacob Scholtz, nulli parcens labori neque ſtudio, omni niſu allaboravit, quo modo labia prædura et tumida tolleret, vulnus manifeſtius redderet, os exſiccaret, ſaniemque copioſiſſimam abſumeret. Verum cum oſſis nigredo neque medicamentis, neque inſtrumentis poſſet tolli, et caro ſuppullulans per futuras animadverteretur, in conſilium et me adhibuit, ubi rebus omnibus præmeditatis, et corpore prædiſpoſito, nullum tutius occurrebat remedium, quam ut latiori candenti ferro per intervalla cranium nigrum cauteriſaretur, et ſucceſſive os occipitis mollius redderetur, nec non beneficio ſagacis naturæ, quæ ſæpius prævertit medicum, ſolveretur.

"Hoc menſe Maji factum, ubi natura maximum os ponderis civilis lotonum trium vel unicæ unius ſemis, protrudebat, paulo poſt ſequebatur minus drachmarum quinque; minima oſſa, numero 83, indies excernebantur, uſque ad menſem Auguſti, ubi ſartus tectus, Dei gratia, patrios repetebat Lates, cum omnium ſtupore. Particulæ oſſium fuere numero 85, pondere fere quadrantis libræ, ut in ſchemate tranſmiſſo apparet. Pro propugnaculo, et occipitis firmamento, provida natura carneam maſſam ſupraduxit, quæ exorta eſt ex Hippocrat. διπλόη, quam ipſe deſcribit l. de vuln. cap. Spongiæ ſimilem, et os ipſum in ſe carunculas multas, humidas habere affirmat his obtentis."

† "Preſque tous les grands praticiens prétendent qu'on doit toujours trépaner dans les playes de tête faites par armes a feu, quoique le crâne ne ſoit pas fracturé; l'expérience ſemble en effet confirmer entiérement leur opinion."

a piece of bone, of the whole ſubſtance of the cranium, ſeparated, and gave iſſue to half a glaſs-full of pure pus, which had formed betwixt the ſcull and dura mater. The patient was dreſſed like one who had been trepanned; the dura mater ſoon cleanſed itſelf, and the opening was quickly filled up, and his cure was accompliſhed in two months *." The danger of ſuch contuſion is manifeſt; the duty of the ſurgeon is direct and plain. Seldom are we to look for ſuch an interpoſition; very rarely does the cranium thus give way, and ſo yield to the burſting of an abſceſs in the ſcull, as to an abſceſs in any other part of the body. I have delivered the caſe of one who eſcaped by miracle, and I ſhall now relate the caſe of one loſt by delay.

"A ſoldier lad, of the name of Bennet, was, on the 4th of June, the King's birthday, ſhot with a piſtol charged only with powder and wadding, and pointed directly at his forehead; the boy who wounded him ſtanding cloſe by him, and firing in a manner over his arm. The wadding hit him on the upper part of the temple, where the parietal joins with the frontal bone. The wound was ſlight; and ſo little was he ſuſpicious of his real condition, that he walked about, unconſcious of any ſerious injury, till the eighth day.

"When he came under our care on the 12th of the month, he had a ſuperficial but ſloughy wound; he ſtill walked about, though in a ſickly and languid ſtate; he had ſlight vertigo, loathing of food, tremblings of the limbs, nauſea, and occaſional rigours. He felt, for the four enſuing days, the benefit of ſlight evacuations, ſevere diet, reſt, and opiates. This interval ſerved as a teſt of his real condition; ſuch complaints might proceed from wound of the ſcalp, or from an affection of the brain; and we were not without hopes of his being ſafe, ſince the pains of his head abated, and the vertigo, ſickneſs, and rigours, almoſt vaniſhed.

"But, on the 17th, his ſituation attracted our particular notice. He had, on that morning, a fit of rigour ſo long and violent, that it denoted a formed abſceſs within the head. On the enſuing days, he vomited the phyſic that was ordered for

* "Un ſoldat reçut un coup de fuſil, qui lui fit une playe ſur le pariétal droit; ce coup ne renverſa point le bleſſé, et ne fut ſuivi d'aucun accident. M. De La Combe, qui viſita la playe, trouva l'os découvert, mais il n'y remarqua aucune léſion; il crut qu'on pouvoit ſe diſpenſer de trépaner ce bleſſé. Le vingtiéme jour il apperçut que l'os devenoit noir, il regarda ce changement comme préparation à l'exfoliation; mais vers le trente-cinquieme il fut ſurpris de celle qui ſe fit, car ce fut une piéce d'os de toute l'épaiſſeur du crâne qui ſe détacha, et qui procura une iſſue à environ un demi-verre de pus aſſez louable, qui étoit placé entre le crâne et la dure-mere. M. De La Combe traita le bleſſé comme s'il eût été trépané. La dure-mere ſe détergea en peu de jours; l'ouverture du crâne ſe remplit aſſez promptement, et la cure fut terminée en deux mois."

him, loathed his food, had a perpetual nauſea, with frequent and violent rigours, reſtleſs nights, and fearful dreams. But his intellect was unimpaired; he liked to ſit upon the ſide of his bed, and do all the little offices about his own perſon; yet I thought I could obſerve him going round his bed, and doing many things without any decided intention; lifting his clothes or little moveables, and laying them down again, and altogether in a ſtate of confuſion; though, when ſeated on his bed, he talked rationally, and gave a clear ſuccinct account of the riots of the day in which he was wounded.

"The dangerous ſymptoms inſenſibly and ſlowly increaſed till the 19th. His ſkin was hot, his tongue parched, his pulſe 112 quick, and moderately ſtrong; his eye languid, and his countenance dejected; his feebleneſs was every moment increaſing; his knees trembled under him; the pains of his head were intolerable, and he now could not endure the light. The previous ſigns of approaching danger, and his preſent weakneſs, and, moſt of all, the ſtate of the bone, which was black and carious, called for our immediate interpoſition; to me, indeed, it appeared, that the operation had been too long delayed, that it was now too late to ſave his life. After a reſtleſs and perturbed night, he ſubmitted to the operation on the twenty-firſt, the ſeventeenth day from that of the injury.

"The ſcalp was laid freely open, ſo as to expoſe a great extent of black and carious bone, eroded and perforated through its outer table with many holes. In the centre of this contuſed bone, the trepan was applied upon the corner of the parietal, where it is joined to the os frontis by the coronal ſuture, which was in part included in the circle. When the bone was perforated, in moſt of the circle thick and mature pus iſſued through the trepan-hole; and when the piece was entirely removed, and his head laid again upon the pillow, it flowed in great profuſion."

This is a period of the caſe, in which it cannot be wrong to ſtop, and reflect a moment on the uſeful leſſons it is calculated to impreſs. We have traced a ſuperficial injury, with ſlight and apparently unimportant ſymptoms, to the moment of a moſt neceſſary but unſucceſsful operation; for, little as his intellect was affected, this abſceſs had been penetrating deep into the very ſubſtance of the brain; and in a few days he expired. We cannot but be ſtruck with all the phænomena of contuſion, and take an intereſt in them, for they are far from being rare; and eſpecially, we muſt be ſtruck with the apparent ſlightneſs of the injury, a ſuperficial wound, unattended, during many days, with either pain or ſickneſs, or any ſign of danger. We cannot but reflect ſeriouſly on the critical condition of ſuch a patient; the ſlight

variations which mark the change from health to the moſt dangerous condition; and above all, on the limited period in which it is permitted us to interpoſe ſucceſsfully; how precious the moments of reflection and conſultation ſhould appear; how vigilantly the ſurgeon ſhould watch over his patient, and mark thoſe changes of the countenance, that expreſſion of the eye, that mixed ſtate of irritation and languor, thoſe alternations of delirium and reaſon, thoſe perturbed nights and alarming dreams, which no nurſe nor hired attendant is qualified to report: And it is worthy of notice, that the matter of a ſuppurated dura mater is peculiarly ripe, *i. e.* yellow, viſcid, and tenacious, (which is to be aſcribed, not to the peculiar nature of thoſe ſurfaces, but to the compreſſed ſtate of thoſe parts, and the continual abſorption of the humid fluids), from the moment in which ſuch abſceſs is begun. And let us not forget, that it is but the uncertainty of the ſigns that ſuſpends our reſolutions, for this is an abſceſs which cannot, like any other, burſt outwardly; which, when once begun, penetrates rapidly to the brain, the moſt ſuſceptible, and the moſt important organ; ſo that there is but a moment in which the patient can be ſaved.

To watch the patient, and diſtinguiſh the ſigns, ſo as to interpoſe with deciſion, void of raſhneſs, and ſeize the ſhort interval that is allowed us, is the mark of profeſſional ſkill. Have we not reaſon to believe, that we might have ſaved this young man's life, by interpoſing early? or that a compliance with that precious maxim juſt now recorded, "of looking upon every gun-ſhot wound as a caſe of contuſion," *i. e.* as a caſe where the life of the cranium is deſtroyed, might have prevented the danger?

But to return to our patient: "The night following the operation, he was reſtleſs and agitated, but without delirium; and half an ounce of purulent matter flowed upon the pillow. He was quiet towards morning, and had leſs of the vertigo, ſickneſs, or pain. This was but a deceitful interval. It was obvious, from the profuſion of matter, that the ulcer had penetrated to the brain; the ſymptoms alſo proclaimed it; and no declaration of an academy of ſurgery, about the unimportance of ſuch abſceſs of the brain, no narrative of hair-breadth eſcapes, will incline a ſurgeon at all acquainted with practice, to look, in ſuch circumſtances, for any thing but death. Before the afternoon he had convulſions, but with his intellect ſtill unaffected. During the night of the twenty-fourth, he was delirious; and, on the morning of the twenty-fifth, was found paralytic of the right ſide; during the night of the twenty ſixth, his urine and fæces flowed continually and inconſciouſly; on the twenty-

ſeventh, he loſt his ſpeech, and had ſtill frequent ſtools. Though he ſpoke a few words on the twenty-ſeventh, he became gradually weaker. The free flow of the matter from within was prevented by a partial protruſion of the brain; and, on the evening of the twenty-eighth of June, he expired.

Diſſection.

"The bone, for a conſiderable ſpace round the perforation made by the head of the trephine, was apparently dead, and its outer table, with ſmall holes, very numerous and irregular. The adheſion of the dura mater was every where perfect, except for a very ſmall ſpace round the trepan-hole. The dura mater itſelf had a duſky brown appearance. There was no abſceſs on its internal ſurface, but many ſmall perforations, and one larger central one; and on the ſurface of this hemiſphere of the brain, immediately under theſe perforations, there were many ſmaller ulcerations, which did not penetrate, and one great and central ulceration, which led to a deep abſceſs in the centre of the brain, directly under the perforation. The edges of all the ulcerations were green and livid; the edges of the abſceſs particularly dark coloured; the reſt of the brain ſeemed ſound, or rather was peculiarly firm, as if from general inflammation."

With this hiſtory before you, and holding in your mind the principles I have already explained, my comments will, I hope, be hardly needful; no diſſection, perhaps, can exhibit a more deciſive picture of the effects of contuſion. The external wound was ſlight, and there was not time for any laceration of the ſcalp to produce caries. There was no general ſhock by which the dura mater could be ſeparated from the ſcull. The exploſion ſo near his head, and the wadding ſo directly hitting the ſcull, had ſo injured its vital powers, that from the moment of receiving the ſhock, it was dead to a conſiderable extent: In but a few days it was black and carious: The dura mater under it was inflamed, though not ſeparated. The ſurface of the brain was ulcerated, and in its centre, under the diſeaſed bone, was formed an abſceſs.

One document, perhaps, ſhould be added to the caſe, viz. the report of the young man's death, as preſented to the magiſtrates, on the occaſion of a judicial inquiry.

"We hereby certify, That John Bennet, common ſoldier in General Ferrier's Brigade, was brought to us on the 11th of June, wounded in the head with the

wadding of a piſtol: From the firſt appearance of the wound, we apprehended that fever and ſuppuration of the brain, which accordingly ſoon manifeſted itſelf, and continued regularly and ſlowly increaſing till the 19th of June, when a conſultation of ſurgeons declared the lad to be in great danger. On the 20th of the month, a ſecond conſultation aſſented to the operation, and agreed that it ſhould be performed next day, if the young man was nothing relieved. On the 21ſt, we found him actually more oppreſſed. The operation was performed, but with little hopes of ſucceſs. Matter was evacuated in ſuch profuſion, as to imply an abſceſs deep within the ſubſtance of the brain. After languiſhing ſix days, he expired. And we have no difficulty in affirming, that his death proceeded from the wound.

" (Signed) ROB. LAWSON.
JOHN BELL."

You are now, Gentlemen, aware of the various aſpects which this kind of caries may aſſume, ſometimes appearing a ſuperficial exfoliation, ſometimes a deeper caries, affecting the whole ſubſtance of the bone, ſometimes, though rarely, the dead part burſting and ſeparating from the living bone; and too often is this contuſion, or death of the bone, followed by fatal ſuppuration within the ſubſtance of the brain. But as yet, I have related no fact, nor advanced any thing, which might lead you to conceive the notion of an injury affecting a part only of the ſyſtem of a bone, of a caries of one only of the tables, and of an abſceſs of the diploe which lies betwixt them. It was what I myſelf never ſuſpected; ſo that the occaſion in which I firſt obſerved it was extremely intereſting.

" A young man, in the prime of life and health, fell from his cart, and the wheel, paſſing obliquely over his head, ſlided upon his ſcull as upon a ſtone. The integuments were torn down to a great extent. There were three large and triangular flaps of ſcalp ſo ingrained with mud and ſand, that the blood, hair, integuments, and ſcull, ſeemed baked into one maſs of filth. The man was profoundly drunk; upon cleaning the flaps of the ſcalp, with the deſign of replacing them, the marks of the cart-wheel upon the ſcull, which was rough and ſcratched, were ſo viſible, as to preclude all rational hopes of re-union; yet the flaps were nicely cleaned, replaced, and held together with ſlight ſtitches.

" That integuments ſo lacerated, and a ſcull ſo plainly injured, ſhould recover, was not to be looked for; but the injured bone might exfoliate, as a mere caries,

and the violence, beſides, was of a peculiar kind, there was no fracture; the patient had received no blow by which the bone might be contuſed throughout; the injury was apparent on the ſurface only, and was probably limited to the external table of the ſcull. The external table might exfoliate, but it was infinitely more probable, that the caries ſhould penetrate and affect the dura mater; and it was our duty to watch for ſigns of danger; and yet to truſt to nature ſo long as the injury ſeemed local, ſo long as it was poſſible that it might exfoliate ſuperficially, and as a mere caries.

"The man, more aſtoniſhed than hurt, was no ſooner reſtored from his brutal ſtate of intoxication, than he appeared to be in perfect health; there were no ſhiverings, no fever, no confuſion of head during the day, nor delirium during the night; much as we were perſuaded of his danger, it was only danger to be apprehended, no ſymptom as yet announced it. The ſuppuration from the integuments in ſuch a caſe is profuſe and foul; and, while ſuch a lacerated wound, ſo ingrained with filth, is cleanſing and granulating, it viſibly mends, and the ſurgeon is too apt to indulge hopes, which are never to be realiſed. In this caſe, the integuments firſt thickened, as they always do, by inflammation; were next waſted by ſuppuration, and remaining ſtill inſulated, the edges became livid, and ſloughed off, while the ſcull blackened more extenſively; a ſlight fever was inſeparable from ſuch a ſtate; his face was full, and his eye heavy and languid; yet that was not much to alarm us; but he ſickened; on the thirteenth, he was reported delirious during the night. We could no longer be reſponſible for delay, and he was trepanned; and circumſtances of the moſt ſingular nature, which I wrote down, (as always I have done by the bed-ſide of my patient), perſuaded me on the inſtant that this was as truly an abſceſs in the ſubſtance, in the cancellated part of the bone, as even a boil was an abſceſs of the cellular ſubſtance of the ſkin."

Remarks in the time of operation, and after it.

"The integuments, by retraction, by ſuppuration, and, moſt of all, by the gangrene or ſloughing of the edges and angles of the ſeveral flaps, were ſo waſted as to have left an extent of naked bone, as broad almoſt as the palm of the hand. The bone, dry and ſcabrous, was black in two places. The perforation was made near the centre of the parietal bone, on a point of bone black as a coal. In perforating the outer table of the ſcull, not the ſlighteſt tint of blood appeared; it ſeemed dry through all its ſubſtance; the ſaw-duſt was black at firſt, and became white in the

progreſs of ſawing, and as dry as hair-powder; it was eaſily blown away, and the working of the ſaw was like the cutting of button-moulds from a piece of horn. The whole ſcull was extremely thick; the ſawing, which was deliberately performed, was of courſe extremely ſlow; at laſt thick and viſcid pus ſpouted up round the inſtrument, and I had no doubt, (although I had before affirmed the dura mater and brain to be ſtill unaffected), that there was an abſceſs; that the operation was fortunate, and might eventually ſave the patient's life. But the moſt accurate probing of the circle with the point of a quill did not diſcover to us even a ſingle point in which the perforation was complete. The inner table, to our utter amazement, was perfectly entire; and there appeared, for a moment, no other rational explanation of this phenomenon, than that the inner table muſt have been fractured, permitting the pus to exude through ſome oblique paſſage, from an abſceſs of the dura mater, to the cancelli betwixt the tables of the ſcull.

"The crown of the trepan was again applied, and, under the impreſſion of there being an abſceſs betwixt the ſcull and dura mater, it was turned boldly and freely, without fear of wounding that membrane, when ſuddenly there iſſued through the trepan-hole much blood; and it was feared, that ſome ill accident had happened, in ſhort, that the dura mater was wounded. But, upon probing with the quill, the inner table was found ſtill entire; there was every reaſon for ſawing ſlowly and cautiouſly; and it was, accordingly, very long of being cut through. During all this ſtage of the operation, the blood flowed profuſely; and, when the circle of bone was at laſt taken out, the blood and matter ceaſed to flow. The dura mater was ſeen white and clean, firmly attached to the edges of the bony circle, and no where ſuppurated; and every circumſtance of the operation inclined me to examine the trepanned circle with particular accuracy.

"The circle of bone ſawed out with the trephine was, except one, the thickeſt I had ever ſeen. The external ſurface was perfectly black; the hole where the centre-tooth of the trepan pierced this carious table, and all the ſides of the ſame table, were of a dead, white, or aſh colour; the cancelli were gaping and irregular, yet without any very particular appearance. But the inner table was red in its ſubſtance, and bloody in its edges.

"The ſtate of the dura mater was, during the cure, the ſubject of my moſt careful inveſtigation. There was, I am well aſſured, no abſceſs; its ſurface changed, and it went through the proceſs of granulating without more matter than that which that proceſs implies, and ſuch as the expoſed ſurface alone might produce. Theſe

deſcriptions, taken carefully from my caſe-book, require no comment. This at leaſt is ſure, that the inner table may remain ſound, and full of blood, while the external table and cancelli are contuſed and dead; and I have no doubt, that this man was ſaved from moſt imminent danger. Every ſuch caries ſhould be trepanned; very ſlight indeed is the chance of ſuch an injury being partial at the firſt, or continuing ſo; ſtill leſs likely is it, that after penetrating juſt to the dura mater, it ſhould be ſeparated, as in a caſe I have formerly related to you, by an effort of nature."

But of all the examples of contuſio cranii, that produced by the grazing of an oblique ball, or the obtuſe blow of a ball, whoſe force is ſpent, ſeems to me the moſt ſimple; no other kind of violence ſo effectually deadens a bone, nor ſo certainly draws after it fatal conſequences. " A Lieutenant of the regiment of Haynault (ſays Mr Martiniere) was wounded with a ſpent ball a little above the right frontal ſinus. The ſurgeon who firſt ſaw him thought it right to make a crucial inciſion, to diſplay the ſtate of the bone, which he found free from fracture or fiſſure. The ball had ſomewhat ſtunned the patient, but bleeding had relieved this ſymptom; and there ſeemed to be nothing to do but take care of the wound. But, at the end of three weeks, the patient fell into a lethargy, with a hard and oppreſſed pulſe. When Meſſ. Petit and Martiniere were called, they found his caſe deſperate; yet they felt it to be their duty to apply the trepan. The perforation gave vent to a great profuſion of pus; but, by being late performed, it was of no avail *."

It is my earneſt wiſh, that you ſhould learn on this, as in all queſtions of practice, to draw your own concluſions from fair deſcription and plain facts. From thoſe which I have now laid before you, you will have, I believe, true conceptions of the ſtate of the bone, of its alteration of ſtructure, of its various modes of ex-

* " Un Lieutenant du regiment de Haynault fut bleſſé par une bale morte, qui lui fit une playe un peu au-deſſus du ſinus frontal droit. Le chirurgien qui le vit d'abord, jugea à propos d'y faire une inciſion cruciale pour examiner l'os; il ne trouva point de fracture; le coup avoit un peu étourdi le bleſſé; mais les ſaignées diſſipérent cet accident; on s'en tint par conſéquent à la cure de la playe. Au bout de trois ſemaines le malade tomba dans un aſſoupiſſement léthargique; ſon pouls devint enfoncé et dur. M. Petit le fils et M. de la Martiniere, chirurgiens-majors de l'armée, y furent mandés; ils trouverent le malade ſans eſpérance; cependant l'opération du trépan leur parut indiquée de façon qu'il ſe crurent obligés d'y avoir recours. Cette opération donna iſſue à beaucoup de pus qui ſe trouva ſous le crâne; mais parce qu'elle ne fut faite qu'à la derniere extrêmité, elle fut inutile au bleſſé. Ces exemples nous font aſſez appercevoir que les coups d'armes à feu ne doivent pas être confondus avec les autres bleſſures de la tête, ou les conjectures que l'on peut tirer de l'inſtrument qui a frappé, et de la force apparente du coup ne décident rien."

foliating, and of the diſmal conſequences which often enſue. But, in addition to thoſe plain facts, I take a pleaſure in laying before you two deſcriptions, the one by Deſſault, the other by Le Dran, which approach to a demonſtration almoſt of the contuſed ſtate of the bone; and I alſo will indulge myſelf, (and perhaps gratify you), by proving, that the ancients have left many evidences in their writings, and many proofs, even in the very terms they uſe, that they were not ignorant of this ſtate of the bone, nor of its concomitant dangers.

" A man (ſays Deſſault) of five and thirty years of age, was ſtruck with a bludgeon over the head; a blow which ſtunned him for a few minutes, but did not knock him down. He had himſelf bled in the foot, drank of a vulnerary potion, believed himſelf cured, and continued well for a month. Then he ſickened, loſt his appetite, his tongue took on a yellow ſcurf, ſhiverings came on, he fell into coma, and died on the ſixth day.

" On diſſection, (ſays Deſſault), we found not the ſlighteſt outward mark of injury; the ſcalp was ſound, the external table of the ſcull had its natural colour, but the internal table was blackened through the whole extent of the parietal bone. The dura mater lining this part of the ſcull was of a colour ſtill darker; yet it adhered as formerly to this ſurface, as to that of the uninjured part of the ſcull, while all the lower ſurface of the dura mater was coated with an aſh-coloured viſcid pus, which not only covered the ſurface, and entered among the convolutions of the brain, but tainted its ſubſtance to the depth of ſeveral lives. The reſt of the brain was ſound and natural *."

There cannot be imagined a more perfect example, or ſhorter deſcription of contuſion, pure and uncomplicated. The integuments ſtill entire, without even the ſlighteſt tumor, ſo that the bone had not ſuffered by any diſeaſe from without; the dura mater ſtill adhering, ſo that, unleſs the bone had been deadened by the blow, it might have preſerved its circulation from within; the bone alone had been injured by the blow, ſo as to af-

* " Voici ce que j'obſervai, à l'ouverture du cadavre. Il n'exiſtoit ſur l'extérieur de la tête aucune apparence de contuſion; les tégumens étoient très-ſains; la table externe de la voute du crâne avoit ſa couleur naturelle; mais la table interne étoit noire dans toute l'éntendue de la foſſe pariétale droite. On voyoit la même couleur ſur la portion correſpondante de la dure-mere, et même un peu au-delà; d'ailleurs cette membrane avoit, de ce coté, les mêmes adhérences avec le crâne, que du coté oppoſé. Il y avoit audeſſous de la dure-mere, et dans l'endroit que j'ai indiqué, une légere couche d'un pus épais et griſâtre, qui s'étendoit juſque dans les anfractuoſités, et qui avoit macéré la pie-mere et la portion correſpondante du cerveau, à quelques lignes de profondeur. Le reſte de ce viſcere étoit dans ſon état naturel."

fect, in its turn, the dura mater, which alone was inflamed and purulent, in conſequence of the death of thoſe parts. But yet, an accidental deſcription of Le Dran pleaſes me ſtill more. " A man, who had been wounded with a ſword, continued well, and walking about in the hall of the hoſpital, till the ſeventeenth day, in the evening of which day he was ſuddenly ſeized with delirium and fever, and ſoon after died. The firſt table of the ſcull was divided by the ſword, the ſecond was only contuſed; betwixt the pericranium and ſcull was a coat of a ſort of purulent mucilage; the ſame purulent mucus was lodged betwixt the cranium and dura mater, and alſo betwixt the dura mater and pia mater.

" When I examined the cranium, (ſays Le Dran), I diſcovered the cauſe of this diſorder. There was no fracture; but *a contuſion, about the bigneſs of a crown, was viſible* in the diploe, diſcoverable by a large black ſpot, which was of an ellyptical figure, in a line with the cut in the external table, and ſurrounded by ſeveral black rays. I have preſerved that piece of bone; and, although it is dry, and I have had it for ſome time, the black ſpot ſtill appears upon the internal table, and not upon the external; but it is more conſpicuous againſt the light *."

Is it not moſt natural, that the blow which ſhakes the dura mater, and ſeparates it from the ſcull, which burſts its arteries, and occaſions effuſion of blood, ſhould alſo burſt arteries, and occaſion effuſions of blood within the ſubſtance of the bone? The above deſcription aſcertains it, and the expreſſions uſed by the beſt of the older ſurgeons aſſure us of its having been long a matter of obſervation. The true and lively manner in which Fallopius deſcribes the mark for diſcovering contuſion, and claims it as his own, will ſtrike you very much. He was ſpirited up to write in this kind of language, by a miſtake of Vidus Vidius, a clumſy commentator, who does, indeed, talk very coolly about the blackening of the bone. " Since (ſays Fallopius) the contuſion of the bone is very dangerous, how, ſay the commentators, ſhall it be known? Not by the ſenſes, not immediately after the fall, not till the third or fourth day. It is to be known, (ſays Vidius), by making an inciſion,—by the blackneſs of the bone. God have mercy on thoſe, whoſe phyſicians think fit to wait

* *Le Dran*, p. 93. I am ſorry to have, not the original, but the tranſlation only of this book; and ſuch a tranſlation, the loweſt journeyman in the trade might well hold up his hands at it. The tranſlator very gravely informs us, p. 76. that " ancient authors have *defended* the re-union of parts which are contuſed;" *i. e.* have forbidden the re-union of bruiſed parts; an anecdote well deſerving a place in D Iſraeli's curioſities of literature. It is juſt the miſtake introduced, by a fellow-labourer at tranſlation, into the ſervice of the church, who, in tranſlating the liturgy, renders, " Dieu defend l'adultere," " God defends adultery."

the blackening of the bone. Why, bones the moſt cruelly mangled and depreſſed, contuſed, as they certainly muſt be, do not blacken, if treated with prudence and care; often, indeed, in wounds, the bone blackens, but that is through length of time; how, then, ſhall we preſently know, whether a bone is contuſed? I have not heard nor read in any writer the ſecret marks of contuſion; but they are as follows:

"Look to your nails; remark their freſh and lively colour, white, tempered with red, but ſpotted with ſpecks of a deader white. Thoſe ſpots have been named by the Greeks nebulæ, by us mendacia; and exactly ſuch ſpots appear in contuſed bone, red at firſt, but afterwards of this dead white; for the bone changes colour in its various ſtates of life, death, and putridity. The colour of a living bone is white, delicately tinged with red; that of a dead bone, unmixed white; that of a putrid or carious bone, livid or black. This is the cauſe why, when you firſt lay open a bone, you find it of a reddiſh white colour; white, becauſe its earth is of the pureſt; and mixed with red, becauſe it contains the finer part of the blood, a ſort of ſanguineous vapour, which, as it is from the blood, is red. And this is my proof, and you may witneſs it, that when I ſcrape the cranium, I have ſcarcely penetrated the ſurface, when blood begins to flow; and ſo it is, indeed, in every bone.

"This being eſtabliſhed, it follows, that during the firſt ſtage, *i. e.* during the two firſt days of a contuſion, that part which is marked with theſe ſpecks of blood is ſtill alive. But the blood exhales by the third day; for then the contuſed parts are divorced, though without any viſible ſeparation from the living bone. They no longer hold a living connection with it, nor are nouriſhed by a circulation of humours; hence the redneſs ceaſes, and the ſpots and ſpecks become white, which is truly the colour of a dead bone. Thus do I recogniſe contuſion by the change of colour; I recogniſe it alſo by its blackneſs; but this is a mark too deciſive, and too certainly fatal, to be waited for *."

* "Mentiuntur, quum dicunt in detectione, non adeſſe periculum. Dicit quis, nonne majus eſt periculum, ſi adeſt contuſio? quomodo cognoſcitur? Inquit Hippocrates quod non cognoſcitur ſenſu, an adſit contuſio, ſtatim poſt vulnerationem; cognoſcitur tamen ſucceſſu temporis, et hoc non negavit Hippocrates; quoniam tertia et præcipue quarta die apparet; quomodo? reſpondet Vidius, per nigredinem oſſis.

"Dii boni! male ageretur cum ægrotantibus, ſi expectaremus nigredinem oſſis, præſertim cum oſſa educta a propria ſede, et contuſa, ſi bene tractantur, nunquam nigra fiant; non nego ego, quod in vulneribus aliquot os contuſum nigreſcat in exteriori ſuperficie, et raro in interna, ſed poſt longum tempus. Sed quomodo cognoſce-

That the ancients, the Arabians at leaſt, were no ſtrangers even to that ſuppuration betwixt the tables of the ſcull, which I have juſt deſcribed, is manifeſt from the following paſſage from the works of Heliodorus, as tranſcribed by Oribaſius.

" *Of Abſceſs under the Bone.*

" The bone which, independent of fracture, is ſuppoſed to have pus under it, or *matter collected in the ſcull itſelf, in the cancelli betwixt the layers of the bone*, ſhould be trepanned, and entirely cut away. If, in trepanning, the pus riſes through the trepan-hole, it is to be ſtopped with lint; for the pus being thus confined, the perforation of the bone is more ſenſibly felt, while the matter is confined by the inſtrument. But, when the collection of pus is truly under the cranium, betwixt the bone and dura mater, the membrane having ſeparated from the ſcull, we are to proceed, as in the caſe already mentioned of a fiſſure, with ſuppuration of the dura mater *."

mus? Ego non obſervavi, nec vidi ſcriptum ab alio. Conſpiciatis ungues veſtros; vos reperietis unguem eſſe coloris albi, ſubrubri, videbitis in eis maculas albas; hujuſmodi maculæ a Græcis nebulæ, a noſtris mendacia vocantur; qualis apparet nubecula in ungue, talis in oſſe contuſo nubecula hinc inde alba apparet; nam triplicem colorem habemus oſſis putridi, viventis, et mortui; putridi eſt niger, aut livens; mortui eſt candidus, viventis in homine vivente non affecto, eſt color albus, cum levi quadam rubedine admixta. Hoc ſtante; cum vos ſtatim detegetis aliquod os, reperietis ipſum album cum rubore; eſt album, quia eſt maxime terreſtre, et optime concoctum; ſi eſſet uſtum et ſuffocatum; nigrum eſſet; terra optime cocta fit alba. Cur habet ruborem? quia in eo continentur partes tenuiſſimæ ſanguinis, vapor, ſcilicet ſanguineus, qui cum ſit a ſanguine, ruber eſt; probabo, quando abradam cranium alicujus, vix abradam portiunculam oſſis, et vos videbitis ſanguinem manantem, ita fit in omni oſſe. Hoc conſtituto, ſi contunditur os, in primo termino contuſionis, vel poſt contuſionem, per duos dies, vel tres, adhuc vivit pars illa continens ſanguinem; poſt triplicem diem exhalat ſanguis, qui continetur in partibus contuſis; cum partes contuſæ, ſint liberatæ ab integro oſſe ſano; quamvis latentis ſeparatione; ideo non habent communicationem alimenti; et hinc eſt, quod ceſſat rubedo, et apparent maculæ, punctim albiſſimæ; qualis eſt color oſſis mortui; quia illa officula mortua ſunt. Ego igitur primis diebus, cognoſco contuſionem, cognoſco etiam ex nigredine, ſed ipſa non eſt expectanda.—*Fallop.*

* XVI. LXIV. *De Oſſibus quibus Pus ſubeſt.*

" Quod dicitur ſubtus purulentum os eſſe ſine fractura, humore in ipſa calvaria collecto *in interſtitio duplicis oſſis*, terebrandum totum id quod abſceſſit, et excidendum eſt. In terebrando ſi humor e foraminibus fertur, retardandus is eſt carptis linamentis objectis, humore enim repreſſo, oſſis perforatio ſenſu percipitur, dum pus a terebra urgetur. Ubi vero collectio ſub calvaria, et in inter os et membranam cerebri ſit, ipſa ab oſſe abſcedente, ea facienda ſunt, quæ de fiſſuris præcepimus cum abſceſſione membranæ incidentibus."—*Orib. de Fract. ex Heliod.* XVII. xix.——And he adds in another paſſage, " Cruor quoque interdum per punctum locum *e cavernulis, ab interſtitio duplicis oſſis ferri conſuevit*, doloreſque prioribus graviores inſequentur. Ubi calvariæ os vel majorem partem, vel per totum caries perruperit," &c. Hippocrates had a perfect conception of the effects of contuſion upon a bone, and deſcribes moſt minutely, not merely the phenomena of caries and exfoliation, but the cauſe

This extravaſation of blood betwixt the tables of the ſcull,—this contuſion deranging even the intimate ſtructure of the bone,—the ancients were familiarly acquainted with. They called it " Sanguis ſubterlabens," which I know not how otherwiſe to tranſpoſe into the language of modern pathology, than by calling it " extravaſated blood." They diſtinguiſhed extravaſation under the ſcull, from extravaſation in the ſubſtance of the bone. " The collection of extravaſated blood (ſays Archigenes) betwixt the two lamellæ of the bone, reſembles the ſpots under the nails; but the blood being quickly converted into pus, brings on a lividity of the bone. The cure of this by perſpiration, and by the exudation of the blood, is eaſy, but the cure of that which is extravaſated upon the dura mater, is every way difficult *."

The fact has never been more accurately deſcribed by moderns; and, in point of philoſophy, they have manifeſtly declined; for the ſuppuration under the ſcull has been aſcribed, in modern times, to the putreſcence of the many ligamentous fibres which connect it with the dura mater; and the death of the ſcull itſelf, to the utter extinction of the radical heat and moiſture of the bone. " Dura menix (ſays Magatus) cum pluribus ligamentis cum cranio connectitur, fieri non poteſt quin ligamenta quæ cum mortuo oſſe copulatur putreſcant, atque ſupra membranam ipſam colliguntur ichores pravi, &c. Conſtipantur calvariæ pori, prohibeturque eventatio, *et labefactatur rationis calor.*" And Wiſeman, very proudly, repeats this profound piece of philoſophy; after deſcribing an exfoliation of the whole thickneſs of the ſcull, he adds, " If you will aſk the reaſon of this, I muſt tell you, that, according to our judgements, it was the effect of the *contuſion*, of which, indeed, there appeared no marks. Yet, without doubt, by the force of the blow, *the heat was extinguiſhed in the bone, and as a dead bone it ſeparated* †." My purpoſe, then, is accompliſhed, if by facts and circumſtances I have been able to convey to you a juſt conception of the ſtate of the bone, which is produced by a blow, and has been

alſo. He ſays, " *Ubi exſangue redditum fuerit, os tunc abſcedit.*" And of an exfoliating bone he ſays, " Ab alio oſſe *ſanguinem* in ſe adhuc habente ac vivente abſcedet; *quia redditum exſangue et ſiccum, ab eo quod ſanguinem habet vivitque, valde abſcedit.*"—*Hippocrates.*

* " Concurſio ſanguinis ſubterlabentis, quæ *quidem ſub ſuperiore duplicis oſſis parte fit*, ut ſub unguibus manifeſta eſt, ſanguis autem tempore in pus converſum os livens oſtendit. Sed hanc et cognoſcere, et curare perforando duntaxat, atque humore emanante, facilius eſt. Quæ vero ſuper cerebri membranam fit, utraque ratione difficilis eſt."—XXIII. LXXI. *E Libris Archigenſis de Sanguine Subtercurrente.*—He means, in this paſſage, to ſay, that it is eaſy, by perforating with a point the carious part of the ſcull, to procure exfoliation, the matter being betwixt the tables. But the danger is great, when the ſuppuration is not in the ſubſtance of the ſcull, but under the dura mater.

† Wiſeman, p. 142.

known and remarked in all ages, " ſaving ſome variations in the phraſe," from the days of Hippocrates, to modern times. The ancients, you will perceive, formed a practical inference, which, moſt unhappily, has been long ſince forgotten. For they, from the ſtate of the bone, inferred the dangerous condition of the brain, and from thence that juſt and moſt important rule, That we ſhould, in all caſes of contuſion, operate early, and judge of contuſion by other marks than its blackneſs. " Dii boni! male ageretur cum ægrotantibus, ſi expectemus nigredinem oſſis."

Now, you might feel as if I had ſtated phenomena, and rules of practice, inconſiſtent with each other. I have delivered it to you as a rule equally ſupported by authority and reaſon, " That contuſion is never to be neglected; that, if you wait for the blackening of the bone, or other deciſive ſymptoms, your patient will die." And yet, from the analogy I firſt uſed in exemplifying the phenomena of contuſion, by comparing the contuſio cranii with the necroſis of a boy's tibia, or the unoffending and ſlow deſtruction of a carious tooth, I muſt have prepared you to hear of ſymptoms protracted for a great length of time; and, (dangerous as the proximity of the brain and its membranes is), you muſt have been led to believe, that ſometimes the brain might eſcape. So indeed it is; the ſymptoms ariſing from contuſio cranii are often protracted to a period of time, which no analogy, nor any thing but the plain unequivocal fact, could induce you to believe. And I proceed to narrate this fact to you with various concomitant circumſtances, in order to complete my deſcription of the contuſed cranium.

It cannot be but that a carious bone may, in any part of the body, remain inſulated, ſurrounded by a fiſtulous and callous ſore, but no where is this condition attended with ſuch imminent peril and danger, as in caries of the ſcull. It is not by the period of the fortieth, or even of the hundredth day, or in any limited term, that we are, in wounds of the head, to judge of our patient's danger; for, as a corrupt and dead tooth may long hold its place (as indeed a gold tooth, or a tooth ſcrewed upon a ſtump will) in its ſocket, exciting, for a long courſe of years, only occaſional pain, and ſuppuration, ſo will a dead bone lie long quieſcent and harmleſs; and yet, when that final ſuppuration, which detaches a piece of ſcull, does come on, it is but too natural, (however long the ſymptoms may have been delayed), that it ſhould endanger the brain. That a contuſed and deadened part of the ſcull ſhould remain thus unoffending, and unaccompanied with ſymptoms, is nothing but what our philoſophy can eaſily explain; it implies no more than that the dura mater, if it eſcape the firſt ſhock, may ſecede ſo ſlowly from the deadened bone, as to leſſen the danger; in ſhort, that a contuſion of the ſcull may terminate in mere ca-

ries. Sometimes the corrupted bone is merely rough, and bare, as is felt by the probe, upon cutting into a puffy tumor. Sometimes it is ſurrounded with tumid integuments, and fiſtulous openings, diſcharging a thin and browniſh ichor. Sometimes it only excites occaſional tumidity, and partial ſuppurations, as in the boy's necroſing tibia. Sometimes the dead bone, divorced entirely from the ſound, burſts away, as in the caſe I have related of the drunken woman. Sometimes it is nearly dry, and bloodleſs, as in a caſe which I ſhall preſently relate to you. Sometimes the ſcalp remains entire, while ulceration imperceptibly deſtroys the bone, and it is ſo entirely abſorbed, as to leave an open circular ſpace. Sometimes, as in a caſe I ſhall ſoon relate to you, the whole cranium is diſcharged. In ſhort, that contuſion which uſually affects the brain, and proves fatal on the fifteenth or twentieth day, terminates ſometimes in mere caries of the ſcull; the patient being, during all the period, in perpetual danger, yet never ill.

It has been the opinion of the profeſſion, ever ſince the days of Hippocrates, and by univerſal aſſent, eſtabliſhed as law, that during forty days from the time of any injury of the head, a man is in danger; that, if he die within that period, it is imputable to the wound; that, till that period have elapſed, the perſon cannot be acquitted who gave the blow. By the paſſages which I now recite to you *, (a comment on Hippocrates, by the very learned Magatus), you will perceive, that from the *ſeventh to the fourteenth day*, has been in all times acknowledged as the uſual period of fever and danger; while yet a patient was not accounted ſafe, and out of

* "Verum tamen non eſt pronuntianda certa ſalus, licet enim decima quarta communiter ſit terminus inflammationis, et morborum acutorum, donec tamen pertranſeat dies quadrageſima, res non eſt in tuto, ut crebra experientia demonſtravit, quandoque enim cæca rimula in oſſe exiſtens, aut occulta contuſio, tarde admodum eſt in cauſa corruptionis oſſis, tardeque defert affectionem ad ſubjectam membranam: quandoque et ob aliquod accidens aliqua puris portio concluditur in diſſecta membrana, aut cerebro, quæ etiamſi veluti guttula ſit, paulatim tamen in continentes agit partes, et progreſſu temporis corrumpit, immo paulatim augetur, tum quia ab eodem loco, ex quo ipſa prodiit, aliquid continuo reſudat, tum etiam quia natura rem moleſtantem ſentiens, atque in ea expellanda omnem conatum adhibens, eo conſuevit ſpiritum una cum ſanguine exprimere; non mirum igitur, ſi quandoque pereant, qui tuti eſſe videbantur; immo aliqui volunt, ubi præſertim detecta eſt membrana, ægrum extra aleam non eſſe ante centeſimam. Sed quoniam rariſſime contingit, ut quis poſt quadrageſimam periclitetur, neque alia de cauſa, quam ob pravam victus rationem, vel aliquam cauſam fortuitam, quæ faciat, ut ad partem vulneratam, quæ a vulnere non modicam imbecillitatem contraxit, humores confluant, et generetur inflammatio, et putredo, vel refrigerando debilem adhuc partis calorem obruat, poſſumus pronunciare certam ſalutem, ſi tamen ægrotantes per longum temporis ſpatium idoneam ſervent victus rationem, et injurias externas devitent, ne occaſione imbecillitatis partis aliquod accedat incommodi. Itaque principium ſpei eſt in emanatione boni puris intra ſeptimam, et quo citius emanat, eo melius cenſendum eſt, ſed confirmatur in decima quarta, ubi per totum id tempus, nec febris, nec aliud ſymptoma acceſſerit."—*Magatus*, p. 202.

danger, *till the fortieth had elapſed.* If, after this critical period had paſſed over, a man fell into danger, it was lawful, it was merciful, to impute his danger to ſome error in exerciſe, or diet, or the paſſions of the mind, or thoſe other moſt natural things, which are wiſely termed non-naturals *. Yet, ſome were willing, eſpecially when the dura mater was hurt, to prolong the doubtful period to the hundredth day. How ill the calculation accords with the real fact, how many exceptions there are to this general concluſion, how very far the period of exfoliation, and conſequently of danger, extends beyond the fortieth, or the hundredth day, you will learn from the following obſervations.

" Donald M'Kay, twenty-nine years of age, after ſerving long in India, was embarked, in perfect health, for England. The regiment being drafted, the ſergeants, corporals, and drum-boys, were ſent home. They were embarked for home by a circuitous rout; firſt put on board at Madras, then carried to Bengal, and thus they ſpent nearly ſeven months at ſea before they reached the Cape. There M'Kay was ſuddenly ſeized with the jaundice, was very yellow, and ſickly, with loathing of food, depreſſion of ſpirits, and that kind of languor which he had often felt during the hot ſeaſons in India. Of this oppreſſive diſeaſe he was not entirely recovered when he arrived in his native country.

" While coming down the Britiſh Channel, ſitting between decks, with his meſsmates, at dinner, a quarrel fell out betwixt two corporals of his regiment, about their ſhares in the meſs. The wranglers were about mid-ſhips, and when he heard their quarrel run very high, and ſaw them about to ſtrike, he ſtarted up from where he was, ſitting by a gun, and being in anger, and entirely forgetful of the nature of the place he was in, he ſtruck his head with ſuch violence againſt a beam, that he fell back into his chair, and lay for a long time as if dead, with his comrades about him, doing every thing they could to reſtore him. He recovered in about half an hour; and, although ſtunned and ſtupified with the blow, he was not ſickened; but next day, and indeed till now, a ſpace of four months, has been in his uſual health.

" Of all kinds of blows, this perhaps is the moſt violent; and, though his ſcalp was not cut, nor the leaſt particle of blood drawn, he obſerved, about the third day after, a tumor, which was from the firſt very painful. He hoped that it would diſappear, and neglected to mention it to the ſurgeon; but it waxed gradual-

* " Mirandum ſane Juriſtas tranſacto 46. die in capitis vulnere, nullum amplius ſubeſſe periculum ſtatuiſſe, ſique poſt dictum tempus letho tradi contigerit ægrotantem, id nequaquam in vulnus rejiciendum eſſe decernunt." —*Schenkius*, p. 18.

ly larger, and from being, as on the third day after the contuſion, ſmall, hard, and knotty, no bigger than the point of the thumb, it was, by the end of the month, as large as a gooſe's egg, not at all painful, and very ſoft.

" He was now on ſhore in England, for he was landed the third day after the blow. His life was perhaps leſs correct, or regular; he was now expoſed to the viciſſitudes of weather. He had come to Scotland, his native country, and was ſtationed at Perth, when the tumor inflamed, became extremely painful, ſo that he could not wear his hat, and was full of matter, which induced the regimental ſurgeon to open it with a lancet; matter flowed profuſely, black at firſt, as if from a mixture of blood, and afterwards pure; and from that moment he was relieved from his pains; the day on which the tumor was opened, he was on guard, in good health and ſpirits, and diſturbed by nothing but the pain and bulk of the tumor. When the matter was diſcharged, and the ſurgeon paſſed his probe into the orifice, he was ſenſible of the roughneſs of the bone, and M'Kay himſelf felt it grate againſt the ſcull. The tumor was thus opened exactly three months after the blow. About fourteen days after, the right eye ſwelled very much, and was at laſt cloſed, with a ſoft and puffy tumor, which induced the ſurgeon to dilate a little the opening in the ſcalp; but it had contracted again before he came under our care, (which was exactly four months after the contuſion), and was almoſt cloſed, ſo as to give vent, with difficulty, to a thin and acrid ſanies; therefore it needed to be again dilated with the biſtoury.

" Upon laying open this ulcer, the bone was felt with the probe, and with the point of the finger, bare, and completely carious; it was ſoft, ſpongy, and the probe entered deep into its ſubſtance, in ſo much that I was fearful of its penetrating actually to the dura mater; it appeared indeed to me, that the matter of the ulcer was heaved up with ſuch regular pulſation, that it muſt have actually received the impulſe from the motions of the dura mater.

" The ſymptoms which immediately enſued, indicated the greateſt danger. It is ſome time before we feel quite at eaſe in probing ſuch a ſore, and we are ſtill longer before we can perfectly underſtand what we feel;—it was in this inſtance not till the fourth day, that I could, without danger or violence, aſcertain with my probe the ſtate of the bone, and then I recogniſed, as in the caſe of Sharpe, and of the old woman, that deep-ulcerated trench, which ſeparates the ſound from the carious bone; when I felt this decided mark, I could certainly predict an exfoliation of both tables.

" But now an alarming and fatal ſuſpicion aroſe of this being a venereal caries, and of great extent; for, along with the ſuſpicions naturally attached to his profeſſion of a ſoldier, there appeared a diſtinct tumor, a new abſceſs, and, upon opening it, a greater extent of carious bone than we had ſuppoſed. Upon inquiry, I found, that the blow had been immediately followed by a general and extenſive tumor; that the fore-part of this tumor being opened, the whole was leſſened; the back-part, as well as the fore-part, ſubſided in ſize; but the back-part, in proportion as it ſubſided, formed a diſtinct tumor, and terminated in a ſeparate abſceſs, yet ſuch a one as plainly implied, that both ſuppurations and ulcers opened upon one carious ſurface. Now his appetite and ſtrength failed; his face was ſallow and ſickly, and every thing in his manner, voice, and action, indicated extreme languor. There was a general ſoreneſs of the neck and throat, and the head was, by a ſort of ſpaſmodic contraction bent down to one ſide. He had a regularly intermitting pain of the head, which came daily at three in the afternoon, with a fever-fit, and a heavy and ſtrong pulſe. The arteries of his head, he ſaid, beat very ſtrongly, and he felt as if a pendulum were continually ſwinging in his forehead, with a heavy dull pain over all the head, and a ſharp and torturing pain ſhooting down along the left ear to the contracted part of the neck.

" Such was his condition before the exfoliations took place. A large portion of the ſcull was caſt off. The pulſations of the brain, and the granulations of the dura mater, were diſtinctly ſeen, and I allowed two months to elapſe before I renewed my notes of his caſe, when I marked down theſe circumſtances, " that he was now in a very altered condition; his pains in the head gone,—his neck flexible and eaſy,—his face chearful and contented,—the opening nearly healed,—his appetite, and general health, improving,—and the cicatrices becoming firmer every day. Nothing of theſe changes can be attributed to a very ſlight courſe of mercury, which he has taken for three weeks only, and has now left off. I look for his being diſcharged in a very few days, in perfect health *."

* Such is my hiſtory of this man's caſe, to which I now take a pleaſure in adding the hiſtory of his former life; for, in theſe circumſtances, we could not be without ſuſpicion of venereal diſeaſes. In man or woman, it is difficult to extort a true and ingenuous confeſſion; yet, from a ſoldier, a manly and ſenſible fellow, who knew the world, I expected to hear the plain truth: A ſoldier is careleſs in contracting, but equally free in avowing ſuch complaints; and I had ſat many hours on his bed, to learn his real condition, and conjured him, as he valued his health, or life, to conceal or diſguiſe nothing. " Eight years ago, while ſerving under Lord Cornwallis, in the field, he contracted the venereal diſeaſe; but, being in Tippoo's country, and in the face of

I ſhall preſently relate to you a moſt intereſting caſe, in which, by perſeverance on the part of the ſurgeon, and courage on the part of the patient, worthy of its reward, a carious portion of the ſcull was ſucceſsfully cut away. It is my opinion, that the carious bone of a member may be left, till it be diſcharged or looſened by nature; but that when a vital organ, as the brain, is endangered by ſlow exfoliation, the bone ſhould be removed as ſoon as it begins to ſhake; that life being at ſtake, nature, when ſhe makes the effort, ſhould be aſſiſted, but always modeſtly and delicately. There are circumſtances, in which

the enemy, he would not put himſelf upon the ſick-liſt, and was in danger of being imperfectly cured. It was towards the end of the campaign, and when they were about to take quarters for the monſoon ſeaſon, at Bangalore, that he was infected. He had ſmall ſores upon the penis, and a ſlight ſwelling in the groin; but, purchaſing medicines from the black boys who attended the ſurgeons, he cured himſelf; for he got ointments with which to dreſs his bubo, which had burſt, and he then took powder of white mercury, till it ſalivated him. At this time they were on their return from Seringapatam to Bangalore, ſometimes traverſing hunting-grounds, ſometimes occupied in ſubduing the leſſer hill-forts, but always in action, and never a day out of the field. He arrived at Bangalore as the rainy ſeaſon commenced. He had taken the calomel but fifteen days, but he was ſalivating ſtrongly; after reſting ſome time in quarters, the ſwelling of his neck, and ſoreneſs of his mouth, went off. His ſores healed, and he continued in perfect health for two years.

"The war being cloſed, and his regiment quartered in the Carnatic, about forty miles from Madras, he was, without any intermediate affection, without any apparent remains of his diſorder, ſeized one cold night, when he had got wet on guard, with pains which ſtruck into all his bones, eſpecially on the left ſide of the body, and the trunk was as much pained as the limbs. He had occaſionally felt pains in all his bones, and eſpecially had often ſuffered during the night excruciating pains in the middle of the long bones, and eſpecially in the ſhins, but no tumor, not the ſlighteſt appearance of exoſtoſis ever enſued. This extremely cold night entirely laid him up; and he lay three months in the hoſpital quite unfit for duty. The pains were now concentrated in the ſhins. His pains were for ſeveral months very excruciating, eſpecially during the night. Small nodes alſo now appeared on the ſhin-bones. The extreme violence of the pains continued nearly ſix months; during which, he rubbed the parts with camphorated oil, took mercury, till his mouth (though he was never ſalivated) was very ſore. The nodes were about the ſize of a hazel-nut, very hard, very painful, and very difficult to remove. Though he was weakened by the confinement and the mercury, he preſerved his general health, and left the hoſpital, perfectly cured in ſix months, and then reſumed his duty, which was now pleaſant to him, from his having been at once promoted, and been reſtored at the ſame time to perfect health. Yet the nodes had not entirely ſubſided. The pains were ſtill ſevere; for three years he uſed no mercury; but, juſt before leaving India, he entirely recovered from theſe pains, by applying ſpirits of turpentine, which he uſed ſo ſtrong, and ſo inceſſantly, as to bliſter all the ſhins. This was thirteen months before his arrival in England, and before the time of this contuſion. After the moſt careful inquiries, I find no reaſon to doubt, that his pains were rheumatiſm, ſuch as is frequent in India, even among officers, after ſerving many campaigns. I have no doubt, that whatever ſyphilitic complaints he had were cured; and ſee not the ſlighteſt reaſon to believe that any taint remains; his caries was a ſimple contuſion; the ſymptoms long delayed, and his danger very imminent."

it is plainly our duty, not only by ſhaking and moving the deciduous piece, but by cutting and trepanning the ſcull, to remove it; for, when the integuments have ſloughed off; when much, or the whole of the cranium is bare; when the dura mater is ulcerated over almoſt all its ſurface; when one ſeparated piece of bone ſupports an ulceration and caries over a great extent of the ſcull; I ſhould (in hopes of removing that inſulated piece of bone) proceed to the moſt dangerous and fatiguing (for theſe are not painful) operations, as freely as I ſhould pull a thorn out of the fleſh.

The following intereſting caſe, communicated to me by my able and much-eſteemed friend Profeſſor Jeffrey, and related by his nephew Mr M'Dougall, who attended the patient in her laſt moments, will, I believe, be highly gratifying to you. As the patient I have juſt alluded to was ſaved through perſeverance and courage, this young woman was loſt from perverſeneſs and fear; yet I know not how we are entitled to uſe ſo harſh a word as perverſe in deſcribing the waywardneſs of a patient who feels all the horrors and confuſion, without being conſcious of the neceſſity, of the uſefulneſs of an operation, ſo unuſual as that of cutting out an extenſive portion of the ſcull.

"A young woman, living then in London, about ſix and twenty years of age, was ſtruck down by a ſmoothing-iron falling from a height where it had been careleſsly hung, perpendicularly upon her head. It ſtruck her on the top of the head, on the upper part of the left parietal bone. She was conveyed to an hoſpital in a ſtate of inſenſibility, and continued delirious for ſome time. She was bled, the head ſhaved, the wound in the ſcalp enlarged; and when ſhe recovered her ſenſes, ſhe complained of a ſenſe of giddineſs, accompanied with pain of the head, which continued for many weeks. Of the ſtate of the bone ſhe had never been diſtinctly informed, but could perceive at the end of ſome months, that the ſurgeon, or his aſſiſtant, at each dreſſing attempted to extract a large piece of dead bone, which was moveable, and which they ſhook and pulled in various directions. During theſe attempts, the ſore was dreſſed with lint, and poultice was occaſionally applied.

"She remained very long in the hoſpital, (eight or nine months), where her health having ſuffered greatly, the phyſician ſuggeſted to her the propriety of removing to the country. She complied with this advice; and after three or four months ſpent with her friends, ſhe returned to the hoſpital much recruited. Many and various attempts were now made to diſengage the inſulated piece of

bone. Her health began again to decline, her appetite failed, ſhe was greatly reduced by fever, fits, and profuſe perſpirations. The diſcharge from the carious ulcer, profuſe as it had always been, was now greatly increaſed, becoming more profuſe, and extremely fætid, as ſhe fell weaker. Nouriſhing diet and cordials were not ſpared. She felt that her health could not improve in the air of an hoſpital in London, and reſolved to return to Scotland, to live or die among her friends; weak as ſhe was, ſhe performed actually this journey of 400 miles in a mail-coach.

"When leaving London, the gentlemen under whoſe care ſhe had been, charged her never to permit any operation for the removing of the carious part of the ſcull. They remarked, that the bone, which was ſlowly decaying, would be at laſt diſengaged by the ulceration and eroſion deſtroying thoſe parts by which it was ſurrounded; that to this alone ſhould ſhe truſt; the proceſs of nature, they ſaid, was ſafe, and ſure to happen, if ſhe could but regain her health; the expedient which would probably be propoſed to her, of applying the trepan, extremely dangerous.

"On her arriving in Glaſgow, and applying to Mr Anderſon, an eminent ſurgeon in that city, his opinion was ſo entirely oppoſite to this, he was ſo perſuaded of the propriety of removing this inſulated bone, (now entirely uncovered), and of great extent, that he remonſtrated with the patient, argued with her friends, and aſſured all who had an intereſt in her, that the pain, irritation, diarrhœa, and fever, the want of appetite, and profuſe diſcharge, could not fail to bring her ſoon to the grave: But ſtill his advice was neglected, till at laſt her health manifeſtly declining, and her ſituation being in all reſpects hopeleſs, the operation was aſſented to.

"With the deſign of afterwards burſting up the corrupted part of the bone, he applied the crown of a very large trepan nearly on the centre of this extenſive caries; an operation which was not accompliſhed eaſily, nor at once; for ſuch was the perverſe and fretful temper of the patient, fatigued with pain and ſuffering, that ſhe ſubmitted very ill to the operation; ſuch, indeed, was her real weakneſs, that in place of completing the perforation at once, Mr Anderſon thought it prudent to allow two days to elapſe betwixt the firſt and ſecond application of the trepan.

"By this central perforation, (the place and effects of which may be under-

ſtood by the drawing), the inſulated bone was converted into a broad ring; it was of the form of a quoit; and a ſecond perforation, with a ſmaller crown of a trepan, would have divided the ring, have reduced it into the form of a creſcent, and have enabled the operator to break up and extract the caries, without endangering the dura mater. But he was not permitted to complete his operation; if there was either danger or pain in the operation, he had done all the harm, but was permitted to do none of the good that might have been expected. Though prevented from fulfilling his more important duties, he continued his charitable viſits to the patient. He ſtill hoped, in ſome period of pain, or from a deliberate conviction of her danger, that ſhe would allow him to complete his operation; but, wearied with oppoſition, and finding himſelf really uſeleſs, he at laſt withdrew.

"It was from charitable motives only, to ſoothe and alleviate her diſtreſs, without the ſlighteſt hope or deſign of offering any more important aſſiſtance, that Mr M'Dougall now agreed to attend her, and aſſiſt her friends in applying the dreſſings, and keeping her ſore in the beſt condition. The ſtate of matters at this period is excellently well repreſented in the following report by Mr M'Dougall.

"On removing the bandage and dreſſings, I had now an opportunity of ſeeing the extent and appearance of the diſeaſe. The ſcalp had ulcerated and ſloughed off to the extent of five or ſix inches in diameter, expoſing almoſt all the upper part of the ſcull. The inſulated piece conſiſted of the upper and back part of the right and left parietal bones. It extended from the lambdoid ſuture behind, to within two inches of the coronal ſuture before. The ſagittal ſuture was ſeen to run along the middle of this caries, which meaſured tranſverſely five inches, and longitudinally three inches and a half. A great part of the external table of the looſe bone had mouldered away, and the dura mater was ſeen through the trepan-hole, and through many ulcerations in the ſcull, covered with pale unhealthy granulations. The edges of the ſcalp were ſwollen, livid, and painful, and the diſcharge of pus was profuſe, of a dark colour, and very fætid. The inſulated piece of bone was immerſed in matter, blackened on its ſurface, and incruſted with the diſcharge. I could eaſily move this piece of bone a little way upwards or downwards, or to either ſide, the thin edges of it paſſing at each movement under the edge, or between the tables of the ſurrounding bones. It could even be depreſſed a few degrees, though the re-

Fig. 1.

Fig. 2.

Fig. 1. Drawing of the livid and Gangrenous abscess of the Brain — such Abcess is

Fig. 2. Drawing of the Scull of the young Woman hurt by the fall of a smoothing

ſiſtance to this was very conſiderable; nor did the patient complain of any uneaſineſs. It was this reſiſtance that enabled Mr Anderſon to apply the trepna on the inſulated piece of bone itſelf.

" Compreſſes had been applied to prevent the matter from deſcending betwixt the cranium and ſcalp, but without ſucceſs. The matter had worked its way downwards, forwards, and backwards, had deſtroyed the cartilaginous tube of the external ear, giving a free exit to the diſcharge through the external meatus, and had ſeparated the ſcalp from the ſquamous portion of the temporal, from almoſt the whole of the left parietal, and from a great part of the occipital bone. The matter had deſcended to the neck, and formed a large collection there, which pointed; but the patient would not allow of a counter-opening. The application of compreſſes, to prevent its accumulation, was now out of the queſtion, for the ſcalp covering the left and back part of the cranium had become livid, and extremely painful to the touch, and as thin as paper. A bent probe, when introduced under the ſcalp directly backwards, could be paſſed down to the neck, and made to turn round the convexity of the ſcull, till it was withdrawn oppoſite to the ear. The bone felt rough, and denuded of pericranium throughout this whole circuit. The matter exuded alſo from under the bones of the cranium, and had detached the dura mater from them to a conſiderable extent laterally, and downwards to the baſe of the ſcull.

" The ulcerated ſcalp was dreſſed morning and evening with a pledget of lint, covered with ſoft ointment. Tow was applied above the lint, to abſorb the matter, and the whole was retained by a bandage looſely applied. At each dreſſing, about an Engliſh pint of a dark-coloured fætid matter, very much reſembling coffee-grounds, could, with gentle preſſure, be forced up from the neck, and from betwixt the cranium and ſcalp on the left ſide, and diſcharged at the large opening above. The ſcalp bled on the ſlighteſt touch, but the blood was almoſt without colour.

" The patient had at this time ſurvived the accident twenty-three months. She lived about a month longer, her debility daily increaſing till ſhe died.

" The extent of this caries, the form of the inſulated piece of bone, the central opening made with the trepan, and the ſucceſs which muſt have attended a ſecond perforation, will all be underſtood from the ſketch which is laid on the ſame plate with the drawing of a ſuppurated brain. The loathſome condition of this poor debilitated creature, with the profuſion of matter running

from the head, the integuments inſulated down even to the neck, the extreme fætor of ſuch an extent of carious bone, may be conceived from Mr M'Dougall's ſketch. One circumſtance is mentioned, in which you will find an intereſt, ſince it correſponds with many of the facts I have lately laid before you, viz. that the dura mater, which was detached and ulcerated to ſo great an extent, was thickened wherever it continued to adhere to the ſcull *."

I do not know a caſe by which the parallel I have ventured to ſuggeſt, of a contuſed ſcull with a carious tooth, is ſo well vindicated, as that recorded by Mr Marechal, of the French Academy, in the following terms: "A young lady, of about ten or twelve years of age, was ſtruck with a triangle of iron, which fell upon her head. There was no wound. The young lady was ſoon well, but there remained a fixed and pointed pain in one ſpot, in the place of the parietal bone. This pain was aggravated from time to time in paroxyſms, ſo violent as to be attended with fever. The fits of fever were abated by bleeding, and various remedies, but the pain continued for years, and was ſo exceſſive, that they were induced to conſult Mr Marechal, and to comply with his advice, when he recommended that the trepan ſhould be applied. The opinions delivered by the ſurgeons, and the ſubmiſſions of the patient, imply great ſuffering, elſe the one would not have propoſed, nor the other have endured, an operation ſo doubtful in its iſſue. Mr Marechal laid open the bone,—applied the trepan, and remarked, in ſawing the ſcull, that it was as dry as a church-yard ſcull; and the operation was ſo perfectly ſucceſsful, that from that moment the pain entirely ceaſed †."

Nothing can be more certain, than that the caries of the ſcull may continue harm-

* "I need not, Sir, ſend you a copy of my notes of the diſſection; nothing very remarkable preſented itſelf, and the preparation will explain, better than words can, the extent and conſequences of this fracture. I may remark, that the dura mater adhered very firmly, where it was connected with the parietal bones anteriorly, and was in general much thickened in its ſubſtance.

"PETER M'DOUGALL."

† "Une demoiſelle de dix ou douze ans fut frappée par une tringle de fer qui lui tomba ſur la tête; ce coup ne fit point de playe, la demoiſelle fut bien-tot guérie, à la réſerve cependant d'une douleur de tête fixe et peu étendue, qui lui reſta ſur un des pariétaux. Cette douleur augmentoit de tems en tems, même juſqu'à lui cauſer la fiévre que l'on appaiſoit par les ſaignées et les autres remédes généraux; mais la douleur perſévérant toujours depuis pluſieurs années, M. Maréchal fut appellé, et jugea le trépan néceſſaire. Il découvrit l'os à l'endroit de la douleur, et y appliqua une couronne de trépan; il remarqua que la ſcieure de l'os étoit ſéche comme celle d'un crâne qui auroit été long-tems enterré. Cette opération réuſſit ſi bien, que la douleur ceſſa entiérement et pour toujours.

leſs: That it is the ſuppuration by which the piece of inſulated bone is ſeparated from the ſound ſcull, and from the dura mater, that occaſions danger: That there are not always ſymptoms denoting that danger, ſo as to lead us to take meaſures to prevent it: That while the danger is ſuſpended for months, the moment ſymptoms of a bad tendency appear, we have reaſon to pronounce the patient loſt, paſt all remedy. I do not remember any more conſpicuous example of this, than a caſe related by Morgagni, in ſupport of that weak unfortunate prejudice which he had taken againſt the operation of trepan;—unfortunate, for, in the cities of Italy, hundreds periſhed unaſſiſted; and weak, ſince the very facts by which he maintains his opinion are expreſsly ſuch as a ſenſible or experienced man would have looked upon as but too certain proofs of the folly of depreciating, and the danger of neglecting, one of the moſt neceſſary operations in ſurgery.

"A young woman, (and here not having the original by me, I am obliged to truſt to a pedantic and ignorant tranſlation), of no mean parentage, of a ſlender make, of a weak but healthy conſtitution, who had never had any diſorder, except that ſhe had once been afflicted with ſome convulſions, which did not continue; being in good health, and ſitting on a low ſeat, ſhe was ſuddenly alarmed, and hearing a loud noiſe, ſhe ſtarted backwards, ſo as to ſtrike her head violently againſt a marble-ſlab which projected from the wall.

"This happened on the laſt day of March, in the year 1739. She felt no inconvenience for ſome days. Then there was a ſlight pain in the part injured, followed by a painful rigidity of the muſcles of the neck. Yet theſe ſymptoms were ſo very ſlight, that the patient went about the uſual occupations at home or abroad. Who, then, (ſays Morgagni), would at ſuch a time have propoſed to trepan the cranium? what conſultation would have authoriſed? what delicate woman would have ſubmitted to ſo ſevere an operation?"

Take now the reſt of this hiſtory. "She went on thus to the month of Auguſt, without any other inconvenience than what I have juſt deſcribed. On the ſixteenth of the month, I was ſent for, when her regular phyſician gave me the narrative which I have here detailed. He further ſaid, that ſhe had been feveriſh for ſome days;—that her pulſe was hard;—that the muſcles of the neck were ſwelled, rigid, and pained;—that a ſimilar pain deſcended along the ſpine, and that the lower jaw was almoſt fixed;—that ſhe was lethargic, anſwered very ſlowly;—that ſhe was occaſionally delirious;—that her right ſide was ſomewhat affected;—that her

eyes appeared ſlightly convulſed;—that theſe latter ſymptoms had remitted for a few days paſt, while the others continued.

"He alſo mentioned, that the pain in the injured part had of late returned, though without the ſlighteſt external tumor, or diſcolouring. On ſeeing the patient, I felt but too ſenſibly that all he had ſaid was true, that there was now no room for remedies. Having, therefore, (ſays Morgagni), propoſed *ſome things of little importance, on which no calumny could fall, merely in compliance with cuſtom!* I called aſide one of the elder relations, told her how much I feared for the patient's ſafety, and took my leave, with the deſign of returning no more; and indeed her ſpeech forſook her a few hours after I had taken leave of her. In two or three days ſhe died *."

This is the very caſe of the Serjeant M'Kay, with that ſad variety of ſymptoms which we always have reaſon to fear. But Morgagni wanted impartially to reaſon, on this, as on an indifferent point, or to perceive that there can be no principles for the treatment of abſceſs in any leſs precious organ, that may not apply to abſceſs of the brain: That every abſceſs, to ſave the ſurrounding parts, may be opened: That an abſceſs is to be more carefully watched, and earlier opened, in proportion to the ſtrength and reſiſtance of the capſule, membrane, faſcia, or bone under which it is confined: That, *a fortiori*, the brain, the moſt important organ of the body, muſt be preſerved from ſuppuration at every riſk: That no force of ſuppuration can make its way through the ſcull: That although the diſtinct fluctuation of matter, the poſitive proof of its exiſtence, muſt be in other parts our ſole rule of conduct, ſuſpicion, mere ſuſpicion, calls us to open any abſceſs that threatens the brain. Morgagni had not the impartiality to reflect juſtly on this caſe; to reflect, that death was pronounced to be inevitable, while ſafety ſeemed poſſible: he pronounced the patient dying; and ſurely it is not poſſible to be worſe than dead. He who thus pronounces ſentence of death, proclaims (according to the often repeated adage) any remedy deſirable. His blameleſs remedies were culpable negligencies, and his "compliance with cuſtom," a dereliction of duty; and to ſpeak thus tenderly of his own reputation, which neglecting his laſt duties to this patient, though a language extremely common, is ſuch as cannot be approved. "To eſcape calumny," may be thus an object with the phyſician; but we perceive, that in regard to the patient it is a kind of treaſon. There is, in every profeſſion, as well as in war, a bravery and ſpirit of enterpriſe, which opens the way for good

* Alexander's Tranſlation, vol. iii. p. 140.

fortune; and, in this queſtion, it is moſt natural to remind you, that an operation can give no pain to a patient who has loſt his feeling; that the perforation of a bone is to be judged right or wrong, not by the pain, for there is none; but by the neceſſity of the caſe, when there is no other hope for life; and by the chance of ſafety, however ſlender it may be.

But, of Morgagni, and his blameleſs remedies, I ſhall ſpeak more fully by and by. With his moral doctrines I have no concern, but his profeſſional prejudices I ſhall not ſpare.

Such accidents are, indeed, a matter of daily obſervation, and it ſhould enter into your reaſoning on every ſlight affection of the head, where a perſon, though in apparent health for months, remembers to have had a blow. "I remember (ſays Marchetti) another patient, who being hurt on the top of the head, but without any uncovering of the bone, or any dangerous ſign, was cured by his ſurgeons, and continued for three months in uninterrupted health. At the end of that time he was ſeized with a low fever, but without the ſlighteſt relation to his head. On the ſeventh day, he was diſtracted with pains in the injured part of the head, though it had been long heal, and now ſhowed no ſigns of any thing wrong. On the fourteenth day of the fever, he died. On diſſection, I found pus upon the dura mater and brain: ſo falſe is the vulgar opinion, that after the fortieth day, a man wounded in the head will not die *."

That a bone, to become carious, muſt be expoſed, or that, to be annihilated, it muſt be eroded by an open ulcer, is not conſiſtent with the notions I have taught you of a diſeaſed bone. A bone may be as thoroughly deſtroyed by an internal ulcer, as the ſtomach, the lungs, or the cellular ſubſtance of the loins, or the vertebræ of the back. I have many times, in diſſection, found the vertebræ ſoldered together by a callus, the certain produce of an internal ulceration which had healed. I have found the bodies of the vertebræ of the neck inwardly corroded by ulceration, when no ſuch diſeaſe was apprehended. I found once the head of the ſhoulder-bone

* "Alium etiam vidi leviter vulneratum media capitis parte, non detecto oſſe, et nullo apparente ſymptomate, qui à chirurgis ſanatus, tribus poſt menſibus, quibus incolumis ſemper vixit, correptus fuit febre maligna, ſine ullo ſymptomate vulneris capitis; poſt ſeptimam dolor capitis ſubortus, loco vulneris inflicti tribus ante menſibus, in quo tamen jam ad cicatricem deducto, nihil apparuit, ægro decima quarta mortuo. Secta calvaria modo jam dicto, pus ſupra membranas, et cerebrum deprehendi; ut propterea vulgi opinioni credendum non ſit, poſt quadrageſimam diem, capite vulneratos, ratione vulneris mori non poſſe."

thoroughly carious, and much of it eroded; and thus does it often happen with a contuſed part of the cranium, of which we have a very ſingular example, related by Laſſus. "A young man being ſtruck with a ſtone on the parietal bone, the wound was cured in the uſual time. But, about ten years after, a ſmall ſoft tumor was obſerved on the injured part, having a very viſible pulſation, and accompanied with exceſſive pain when preſſed upon.

"Thoſe who were conſulted, pronounced it an aneuriſm. Various quackiſh preſcriptions were applied to it. The pulſation and headachs increaſed. The fever was unremitting. The patient was altogether deprived of reſt, and the tumor puſhed out to the ſize of the largeſt hen's egg, occupying a great portion of the right parietal bone. The pains of the head having become exceſſive, and extended from the diſeaſed ſide over all the head, the patient would have it opened, in oppoſition to the opinion of ſeveral practitioners. The opening of the tumor was followed by hemorrhagy; from the centre of the tumor, they hooked out with the fingers many clots of blood; and when the ſore was thus cleanſed, there was ſeen through a large opening in the ſcull, the dura mater, white and ſound. But, from loſs of blood, the patient fainted; his pulſe fell very low, and, in a few hours after the opening of the tumor, he expired. On diſſecting the head, there was found a great loſs of ſubſtance in the parietal bone. The dura mater ſound, but depreſſed, ſo that the right hemiſphere of the brain was repreſſed towards the left-ſide *."

Neither the ſlightneſs of the injury, nor the ſlowneſs of this proceſs, nor

* "Une jeune homme reçut un coup de pierre ſur le pariétal droit. Il en réſulta une plaie qui parut ſe guérir complétement dans un eſpace de temps aſſez court. Mais environ dix ans après, on vit dans l'endroit qui avoit été frappé une tumeur molle, qui avoit des pulſations bien ſenſibles, et qui cauſoit beaucoup de douleur au malade quand on la comprimoit. Des perſonnes de l'art conſultées décidèrent que cette maladie etoit un aneuriſme. Différens topiques indiqués par des charlatans furent appliquées. Les douleurs de tête, et les pulſations de la tumeur, augmentèrent: la fièvre devint continue, et la malade fut privé de ſommeil. Cette tumeur augmenta peu-à-peu, et acquit inſenſiblement le volume d'une très-gros œuf de poule. Elle occupoit une grande partie du pariétal droit. Les douleurs de tête étant devenues exceſſives, non ſeulement dans l'endroit ou étoit la tumeur, mais méme du coté oppoſé, le malade la fit ouvrir malgré l'avis contraire de pluſieurs praticiens. L'inciſion faite, il y eut une hémorrhagie aſſez forte, et l'on retira avec les doigts du centre de la tumeur pluſieurs caillots de ſang. Lorſq'elle fut complétement vuidée, on vit à travers un grand trou au crâne la dure-mère, qui étoit très blanche. Le malade tomba en ſyncope par le perte du ſang, ſon pouls s'affoiblit, et il mourut trois ou quatre heures après l'ouverture de ſa tumeur. On examina la tête, et l'on vit une grande déperdition de ſubſtance au pariétal, la dure-mère dans un état ſain, mais déprimée ou enfoncée, ainſi que le lobe droit du cerveau qui étoit repouſſé vers le coté gauche."

the final unhappy fate of the patient, nor the entire deſtruction of the ulcerated bone, muſt ſurpriſe you, for theſe are phenomena perfectly conſiſtent with the moſt common laws of the animal œconomy, and confirmed by many ſimilar facts. The following ſimple narrative of the ſame diſeaſe, produced by the ſame cauſe, a ſlight blow, enduring for ten years, growing with the body's growth, and ſtrengthening with its ſtrength, but at laſt cured by a nice and delicate operation, will intereſt you. It is related by Wiſeman, ſerjeant-ſurgeon to Charles I. in nearly the following terms:

"A lady fell down, with her child of half a year old in her arms. The mother was hurt, and the child ſlightly ſcratched on the left ſide of the head. The hurt was viewed by ſome pretenders to ſkill in ſuch things, and judged of no moment: But from that time the child grew indiſpoſed, and vomited often, eſpecially after receiving her ſuſtenance; and, as ſhe grew able to ſpeak, complained of pain in that part of her head; and, by reaſon of her frequent vomiting, and conſtant pain, ſhe languiſhed daily. After ten years, a ſmall tumor appeared in that part of the head which had been hurt. The parents again conſulted, and afterwards brought the child to me, a very ſtarveling. I viewed the tumor, and felt in it a pulſation, which at firſt I thought an aneuriſma; but preſſing my finger more into it, I felt the membrane of the brain, without any ſcull, the breadth of an Engliſh ſhilling. This at firſt a little amazed me: But, upon conſideration of the fall, and the ſymptoms ſucceeding, it was evident to me, that by the fall the ſcull was fiſſured; and being of a thin cartilaginous ſubſtance at that time of her infancy, *had through continuance mouldered away;* and the dura mater, thruſting outwards, had, by adheſion to the pericranium, united in one body with it. This I ſuppoſed the caſe. The preſage here was a ſudden death, if the cure was not attempted; and in the attempting it, ſhe was in great danger. To begin this operation by a circular inciſion, the compaſs of the tumor in the ſcull, was not difficult: But then to ſeparate theſe two membranes, the dura mater from the pericranium, or this from that, was an hard taſk even in a dead body; here in a weak child much more, where the blood would be apt to blind me, and the impatience of the child render it hazardous, the work of ſeparation requiring a great ſteadineſs in both of us. Wherefore, I reſolved to lay the ſcalp open by cauſtic. To which purpoſe, I forewarned them firſt of the danger, either in leaving the child to die by its malady, or attempting the cure doubtfully. But they having conſulted others before, were ſenſible of the danger the child was in by its diſeaſe, and readily commended her into

my hands, and lodged her near me. I cauſed the hair to be ſhaved off from the tumor, and applied upon it the moſt gentle cauſtic I could deſign. At ſuch time as I thought it might have made its way through the ſuperficies of the calvaria, I took it off, and with a cauſtic-ſtone rubbed into the muſculous ſkin; then waſhed out the ſalts well, with wine firſt, then milk. After that, I embrocated it with warm oil, and cut into the eſcar, embrocated the part again, and dreſſed it up cum unguent. baſilic. with ol. roſ. applying emplaſtrum e bolo over all, with compreſs and bandage. That night ſhe was ſeized with a fit of convulſion, frequently vomited, and was very ill. Dr Fiſher was fetched, and preſcribed her a cordial julep, proper in her caſe, and relieved her. The next morning I took off the dreſſings, and raiſed up the hairy ſcalp round from the ſcull, ſo far as the cauſtic had ſpread, which gave a breathing to it, and diſcharged a little ichor. From that time her vomiting ceaſed, as alſo the convulſive fits, and ſhe began to be more lively than in ten years before. We kept her in bed, warm and cloſe, and preſcribed her a ſlender diet, allowing her only ſpoon-meats. Her phyſician took care in what concerned her health, by internals. I proceeded to haſten digeſtion, and by fomentations, and the like, to cheriſh the native heat of the part. Some places I digeſted, others I deterged. It was a nice work, but ſucceeded happily. While ſome ſloughs were ſeparating, other parts incarned, and cicatrized. The patient at length being in a fair way of recovery, I invited Sir Charles Scarburg, and Dr Walter Needham, to ſee her dreſſed. The dura mater was then incarned, and the edges of the bone exfoliating; after which the wound cicatriſed, and contracted to very narrow compaſs. The child afterwards returned to her friends, perfectly in health, and is a witty child; but it is thought ſhe will be but a dwarf*."

I offer this caſe to you, not as a precedent, or rule of practice; I have warned you againſt touching ſuch tumors. Nothing but ſucceſs could vindicate this raſh operation. I relate the caſe, as completing the phenomena attending contuſio cranii; and having deſcribed to you all the varieties of the diſeaſe ariſing from caries, I proceed, by another analogy, to illuſtrate an affection of the ſcull, a febrile caries appearing chiefly in ſcrophulous habits, but excited by cold, and which is ſufficiently frequent to deſerve your notice: a diſeaſe which has given me much anxiety in practice, which has been a frequent occaſion of controverſy among profeſſional men, and of venereal diſeaſes being ſuſpected where none exiſted. The difficulties in

* Wiſeman, p. 139.

which I have felt myſelf involved, along with others of the profeſſion, I dare not mention to you, but I believe, that ſyphilis is chiefly ſuſpected as the ſole cauſe of diſeaſes of the cranium, by thoſe only who have not reflected on the perfect circulation and ſenſibility of the whole bony ſyſtem, and who have not ſufficiently remarked the obvious fact, of bone being as liable as any part of the body to be affected by diſeaſe as by injuries, by fever as well as by external violence.

" Daniel M'Bride, an orphan of fourteen years of age, was put to work at Dale's cotton-mill, at Lanark, when ſix years old, and remained there till he was twelve years of age. It is an aſylum for the children of the poor, the good order and liberal conduct of which correſponds well with the charitable deſigns of the proprietor; and this boy left it in vigour and perfect health, to go into the ſervice of a neighbouring farmer, where his employment was to herd cattle on the moor. He kept abroad the whole day with his cattle, endured every ſeverity of the ſeaſon; and being unconſcious of the neceſſity of exerciſe to fortify him againſt the cold, he was wont to ſeat himſelf by a dike, or under the ſhelter of a wall, wrapped in his plaid.

" On a ſevere winter-day, when the ſnow lay very deep, and drifted about him, the little creature did not return home from the morning till night-fall, and then benumbed with cold. He was no ſooner in bed, than he was in a fever;—his temples beating,—his head very confuſed, he was tormented with ugly dreams, and thought the devils were pulling him out of bed. He waked often from this perturbed ſleep, with a violent pain in his knee, and in the morning found himſelf lame, and quite unable to walk.

" During ſeveral days, the pain in his knee increaſed, and thence it ſhifted to the fore-part of the leg, on the ſhin-bone, and there it remained for three weeks. At firſt, when his knee was pained, it was at the ſame time ſwelled. When the pain ſhifted to his ſhin, the ſwelling deſcended to the fore-part of the leg. His whole leg became ſwollen, unſhapely, and as red as a roſe; and, at the end of three weeks, the gathering burſt on the middle of his ſhin, and left the bone expoſed and bare. Several openings ſucceſſively burſt out in different places along the ſhin, and at every new opening the dead bare bone was ſeen or felt. Unable to work, he left the farmer's houſe, and went upon the road to beg his bread. At laſt he found his way to town.

" When I firſt ſaw him, I found him leſs emaciated from want and pain than his hiſtory ſhould have led me to expect. Nor could I remark any of the uſual ſigns of

ſcrophula; for his hair was dark brown, his eyes of a deep blue, with a wide pupil; his upper lips, and noſe, ſmall, and well proportioned, and his countenance healthy, and he was of a ſquat and ſtubby form. The openings along the face of the tibia were numerous; the bone, through its whole extent, bare and black; partial exfoliations, at its upper part, had looſed the upper end of the ſhaft from the big head of the tibia, where it enters into the knee-joint, and the carious ſhaft of the bone protruded through the uppermoſt ſore."

Such is that ſhort deſcription which I find in my caſe-books, repreſenting, and in few words, my general conception of febrile necroſis, or death of the bone; and whether a bone dies from contuſion, is injured by cold, or periſhes from ſcrophula, (with the help of ſome ſlight occaſional cauſe), its death is accompanied with this ſudden fever,—this violent pain,—this inflammation, which ceaſes only when that ſuppuration is complete which ſeparates the dead bone from the parts ſtill retaining life. You will find it a juſt and uſeful parallel, and I haſten to prove that it is ſo, by preſenting to you, on the higheſt of all authority, a picture of the ſame proceſs deſtroying the ſcull.

"The Germans are accuſed (ſays Stoltz) by Siverinus, and various writers, of having ſuch effeminate and unmanly diſpoſitions, that they would rather die of any vile and loathſome diſeaſe, than ſuffer a neceſſary painful operation. How unjuſtly they are accuſed, I will prove by the following narrative. It is the caſe of Otto Erneſtus de Rautem, Lieutenant-Colonel, and lord of many ſeigneuries, a brave and reſolute man, of one and thirty years of age, of a ſtrong and muſcular form, of a bilious habit, full of health and ſpirits, a year and a half married, and lately become a father. On the 24th of Auguſt 1695, having left the army, and being on his return from Brabant to Germany, his native place, impatient to viſit his paternal domains, his friends, his lady, who might be on her way to meet him, he travelled by night in weather very tempeſtuous, and extremely cold, which he felt moſt ſeverely; and to this night's travel did he aſcribe all his future ſufferings. He arrived happily at home, but hardly had embraced his wife and friends, when ſuddenly he was ſeized with excruciating pains in the head, which for ſeven weeks after were continual, unremitting, torturing; and when they abated, there remained for eight days a vertigo and confuſion of head, which was allayed by a preſcription of Godſched, his phyſician.

"Hardly had three weeks elapſed, when thoſe dreadful pains returned, ſhooting through the head for fourteen days with excruciating torture. He ſet off

for Koningſberg, to conſult us. But, in the middle of his journey, when yet ſix miles from the city, and having arrived at Abbarta, one of his ſeats, his whole head ſwelled to ſuch a degree, that the preſſure of the fingers left deep impreſſions, and the ſwelling terminated in a few days in an abſceſs, as big as the largeſt peacock's egg; which, being ſoftened over night with a poultice, was in the morning opened with a lancet, diſcharged much pus, flattened gradually, and almoſt diſappeared on the fourth or fifth day; but ſtill the opening poured out a thin ſanies; nor, though moſt curiouſly dreſſed, could it be brought to cloſe in leſs than a quarter of a year *.

" Fourteen days had ſcarcely elapſed from the time of this fiſtula being cloſed, when the tumor roſe again on the ſame ſpot, to the ſize of a ſmall egg. Having heard a certain quack greatly praiſed for his ſkill, he made an excurſion to Heilkeim, a ſeat of his noble brother's, about half a mile diſtant from the caſtle, when a plaſter having been applied to the tumor by this famous empyric, the tumor burſt in the morning, and poured out a profuſion of pus. Thus did this nobleman remain for ſeven weeks under the cure of the empyric, by whoſe promiſes he had been allured, for he aſſured him that the abſceſs ſhould be cloſed in that ſpace of time. But, when the period was elapſed, the patient diſappointed, and this pretender fallen ill himſelf, of, I doubt not, a fictitious malady, he called a third ſurgeon, Bartholomæus Fuchs, a ſurgeon of Raſtenbourg; but, fearing to truſt himſelf ſole-

* " Immerito a Conrado Tigurino de ſcriptorib. chirurg. et Renerio Solenandro, conſ. 24. ſect. 4. uti refert et aſſentitur Marc. Aurel. Severini efficac. medic. l. 1. part. 1. cap. 3. tantæ mollitiei accuſari Germanos, ut turpi morte mori malint, quam generoſo animo unam dolorificam ſuſtinere operationem chirurgicam: verum reddere poterit vir generoſus et maxime ſtrenuus, Dominus Vice-Colonellus, Otto Erneſtus de Rautern, in Abbarten, Deutſch-Wilten, Gurgenau, Plenau, et Glugenſtein, dominus hæreditarius, triginta et unum annum natus, ſtaturæ mediocris, habitus carnoſi et firmi, temperamenti biliofi, ſeſqui annum maritus, alacer et vegetus, unius filiolæ tum parens; qui 24. Auguſti, anni ſupra milleſimum ſexcenteſimum, nonageſimi quinti, cum in Brabantia functione militari ſe abdicaſſet, in patriam redux, ut ſibi obviam properanti dominæ conjugi anteverteret, noctu milliaria noſtratia (Germanica) cœlo adeo intempeſto et frigido, ut ex eo etiam refrixerat (quam refrigerationem mali hujus occaſionem fuiſſe, ipſe dominus patiens autumat), confecit; ad prædia ſua, et ſuos reverſus, dulcibus ab iis, et chara præprimis conjuge amplexibus exceptus fuit. Mox vero intolerabiles eum capitis invaſerunt dolores, ſeptimanas ſeptem continuas, indefinenter affligentes, quibus deſinentibus octiduo circiter poſt, vertigo multum moleſtiæ exhibuit, quæ tamen poſt tranſmiſſi a domino licent. Godſched medicamenti uſum, evanuiſſe videbatur; immanes autem iſti dolores, hebdomadibus vix tribus elapſis, iterum ingruerunt, diebus quatuordecim, caput atrociter lancinantes, quare etiam contra dolores remedia quæſiturus, iter ad nos (Regiomontum) iniit; in medio vero itinere, cum ſex milliaribus ad huc Regiomonto, Abbartam (quod etiam prædium domini patientis eſt) ventum eſſet, caput totum adeo intumuit, ut ad preſſus, veſtigia primores digitos alta, relinquerentur; aſt

ly in his hands, he, under this ſurgeon's care, undertook the journey to Koningſberg, where Godſched, a licentiate, Auguſtin Groſmann, and Carol. Joſephus Viviani, an Italian ſurgeon, were called together to conſult. They found, upon examining the ſore, which was in the vertex at the meeting of the coronal and ſagittal ſutures, a ſmall fiſtulous opening, through which the probe paſſed three inches under the ſcalp, tending towards the occiput. The probe, upon being preſſed againſt the further end of the fiſtula, raiſed up the integuments; and at that point a ſmall opening was diſtinguiſhed in the ſcull itſelf. It was accordingly reſolved, that all this part of the integuments ſhould be opened with the biſtomy. On the 13th of September 1696, the integuments were thus opened, and the head bandaged up on account of hemorrhagy; and, on the 14th, the fleſhy ſcalp and pericranium, with the perioſteum, were divided with the ſcalpel; but as yet no caries could be obſerved in the place of the ſagittal ſuture. On the 15th, the third day after his arrival, a ſmall fungus began to protrude from the opening of the ſcull; but, as it was ſuch as might be eaſily ſeparated at any time, it was reckoned of no moment. He now returned home, provided with proper dreſſings; the part was daily embrocated with balſams, and dreſſed with proper ointments; every pains was

tumor hic in abſceſſum, ovi gallinæ Calecuticæ bene magni magnitudinis, triduo fuit ſupra verticem collectus, qui emplaſtro, per noctem impoſito, emollitus, die ſubſequente gladiolo ſeu lancetta apertus, multum puris fudit; et licet tumor quatuor quinqueve dierum intervallo, diſparuerit, indefinenter tamen ichor, ſeu ſanies tenuis, ex eo promanavit, neque ad coalitum, quamvis probe deligaretur, et convenientia emplaſtra ac epulotica imponerentur, niſi poſt anni quadrantem, perduci potuit. De hinc, elapſis diebus quatuordecim, denuo, eodem quidem in loco, tumor, magnitudine minoris ovi, extuberavit, quare, cum Balneatoris Gerdavienſis ſibi haberet commendatam experientiam, Wilkeimum, prædium beati fratris ſui germani, Domini Wilhelmi Alberti de Rautern ſupremi, aulæ Brandenburgicæ, Mareſchalli ac Capitaneatuum Neuhauſen et Labiau Satrapæ, dimidio milliari ab arce Gerdaven diſtans, ſe contulit, ubi ex tumore, (emplaſtro ab accerſito Balneatore iſto, veſperi impoſito), mane rupto, pus magna vi erupit, ſubſtitit illic dominus patiens ſex ſeptimanas integras, promiſſis, ſe intra tempus hoc ſanatum iri, fretus, cum vero tempus hoc præteriiſſet, nec aliquid opis, quamvis quotidie deligatus eſſet, ſentiret, chirurgus inſuper ipſe morbo corriperetur (morbum fuiſſe ſimulatum ſuſpicor) tertium ſibi chirurgum, Dominum Bartholomæum Fuchs, Raſtenburgo adſcivit, cui ſoli cum ſe concredere dubitaret, eum ſibi comitem itineris elegit, hucque Regiomontum cum eo venit; acciti fuerunt, Dominus Joannes Godſched, med. licent. et P. P. ac Auguſtinus Groſmann, ut et Carolus Joſephus Viviani, Roma-Italus, chirurgi, qui inſpecto et examinato malo ſupra verticem, qua parte futuræ coronalis et ſagittalis ſibi committuntur, parvum invenerunt foramen, per quod ſtylus, longitudine digiti, ſub cute, occiput verſus, adigi potuit, qui ad extremitatem meatus offendens, cutem aliquantulum elevavit, quapropter eouſque eam incidendam eſſe, ratum fuit viſum, facta inciſio atque delegata die iſta (erat 13. Septembris anni 1696), ob hæmorrhagiæ metum.

" Die 14. Septemb. ſcilicet, panniculus carnoſus cum pericranio et huic adnato perioſteo, cultro inciſorio perſcinderentur, caries tamen in futura ſagittali nondum fuit obſervata.

ineffectually uſed to cloſe the ulcer; a month had elapſed, and we were informed by this attendant ſurgeon, that the opening in the ſcull continued to pour out matter, and he returned to us to Koningſberg.

" Next day, the 11th of October, a new conſultation was called: On the 13th, a phyſician, Dr A. Harweck, was added to our number: Groſmann the ſurgeon proceeded to probe the wound, and, having paſſed his probe into the opening of the ſcull, he found it paſſed onwards ſomewhat obliquely to the depth of an inch and a half. Encountering at that depth ſomething hard, he withdrew the probe, perſuaded that the ſcull could not be of this thickneſs, certain that he had penetrated into the cavity, certain alſo that what he felt was neither brain nor dura mater, nor the internal table of the ſcull, unleſs, indeed, ſome exfoliated ſcull from the inner table was lying upon the membrane. The conſultation now agreed, that to aſcertain what it was that lay ſo deep under the ſcull, the trepan ſhould be applied; then a crucial inciſion was made, having this opening in the centre; the corners of the inciſion were diſſected, and carried backwards, and, on account of hemorrhagy from the arteries of the ſcalp, the wound was dreſſed forthwith, and, not next day, but the day following, was appointed for applying the trepan. At three in the afternoon, the bandages having been undone, the cranium being bare, the ſeat of the evil was plainly ſeen. The bone, at the meeting of the coronal and ſagittal ſutures, was

" Die 15. ſeu tertia ab adventu ejus, ſupra foramen excreſcentia quædam in conſpectum venit, quæ tamen, quod facillime ſepararetur, habita fuit nullius eſſe momenti, quare poſtero mane,

Die 16. nempe, acceptis ſecum emplaſtris convenientibus, et balſamo vulnerario, domum revertit: applicata fuerunt emplaſtra, præmiſſis ex balſamo inunctionibus, debitæ quoque deligationes quotidie fuerunt inſtitutæ, uſque dum, quatuor hebdomadarum ſpatio elapſo, cum ad coalitum vulnus perduci nequiret, ſed foramen in calvaria, potius continue, pus funderet, comite itineris, modo nominato chirurgo Raſtenburgenſi accepto, quo vitæ et ſanitati ſuæ conſuleret, iter ac nos, Regiomontum, relegeret; acceſſit autem.

Die 11. Octobr. Convocatis itaque die ſequenti dn. medico et chirurgis ſupra nominatis, de re videbatur eſſe, unum adhuc advocare medicum.

Die 13. Dn. Adamus Harweck, M. D. & P. P. etiam fuit adjunctus; pro inveſtigando itaque malo, Dn. Groſmannus, foramini pus fundenti, ſtylum per calvariam, ſeſque digitum plus minus, oblique licet, immiſit et ad quippiam duriuſculum renitens illiſit, quod illico retulit addens, calvariæ craſſitiem tantam eſſe non poſſe, quanta quidem ſtyli immiſſi longitudo cerneretur, ad interiora itaque penetraſſe eum, eſſe manifeſtum; nec tamen cerebrum vel meningem, nec calvariæ interiorem laminam id eſſe; ad quod offenderet (niſi deſquamatum laminæ hujus fragmentum, duræ matri incumbere, conjecturandum foret) cerebro enim durius, mollius oſſe reperiri: quo ergo, quid lateret intus, pateſceret, trepanum adhibere ſtatuerunt; facta propterea tunc fuit in crucem inciſio, ita ut foramen, in medio præter propter, relinqueretur, et labra vulneris a cranio, quo ſic denudaretur illud, avulſa et reclenata fuerunt, ſanguine ſatis large effuſeque profluente, pro quo ſiſtendo, ſtupa ſufficiente impoſita,

rough and carious; the opening in the cranium was plugged up with a fleshy excrescence, of the size of the nail of the little finger; and the probe being insinuated by the side of it into the cranium, passed very deep. The fungus was this evening pared away, and the sore dressed.

" On the 15th, the consultation was again convoked, and would now have applied the trepan, but for the soreness of the integuments, and other circumstances of the wound; the fungus was again pared, the wound dressed, and the patient committed to sleep, which was somewhat disturbed with thoughts of the operation, which was next day to be performed.

" On the 16th, the first crown of the trepan was applied; and the circle of bone being picked away, its inner table was found black and carious. The fungus protruded, so as to occupy the trepan-hole, while the pus exuded by one side. Things looking thus ill, required deliberate consultation; and, in order to proceed with more caution, other consultants were called in.

" On the 17th, no change of symptoms, no diminution of the tumor appeared; a few carious scales being extracted, the probe passed under the scull more easily, especially towards the right side; and the number of consultants being again in-

deligatio conveniens administrata fuit; trepani vero applicatio, in diem perendinum, certas ob rationes, fuit dilata.

Post horam hujus diei vespertinam tertiam, inspecto vulnere, cranium denudatum, inque ipso, futuræ sagittalis et coronalis concursu, mali sedes comparuit, ipsumque os, asperum et scabrum, carneque spongiosa et ad magnitudinem unguis minoris accedente, obsessum, fuit repertum, atque stylus in cranii foramen adactus, alte penetravit: resecta itaque carne luxuriante, vulnus deligatum fuit.

Die 15. Supra nominati dni. medici et chirurgi convenerunt, atque prium trepanum jam applicassent, nisi in crastinum operationem hanc differendam esse, tum labia vulneris trepanum impedientia, tum obstacula alia id dissuasissent. Unde diductis magis labiis, et excisa, quantum potuit, carne spongiosa, deligato vulnere, quietem ægroto, et usum pulveris de die 13tia Octobris, injunxerunt: nocte exacta, quam varia insomnia, ob instantem trepanationem interturbaverant.

Die 16. Trepanum primum adhibitum fuit, atque perforato cranio, excisum osticulum exemptum, tota sua interiori lamina cariem passum, sub ipsa calvaria vero, ad matrem duram, fungosa caro, per totum foraminis spatium et latius adhuc expansa, ut et pus ad latus foraminis dextrum promanans, in conspectum venerunt. Singulis res hæc altiorem peperit meditationem; quo enim affectus hic rarior, eo etiam gravior, curatuque difficilior habitus fuit: visum est propterea e re esse, plures accersere medicos, et eum consilio aggredi curationem.

Die 17. Symptomata nulla observata, nec fungus immutatus apparuit, ex vulnere fragmenta quædam ossea exempta, stylus, latus dextrum versus, sub cranium, minus vero sinistrum versus, adigi potuit; vulnus itaque deligatum debiteque munitum fuit, et cerevisiæ potus, decocto passular, addito, concessus; unde alvus laxior reddita: concessus quoque pro recreandis spiritibus, vini caliculus; vesperi eadem vulneris facies observata, eademque cura continuata.

Die 18. Et ego ad dn. ægrum, pridie illuc vocatus, accessi, et præter supra nominatos dn. medicos atque chi-

creaſed, and the parts carefully inſpected, this was the unanimous deciſion: "That, as the inner table of the ſcull, where it was trepanned, and the outer ſurface of the parietal bone to a great extent, was plainly carious; as the fungus extended beyond the trepanned part, and neither the caries nor fungus could be ſubdued otherwiſe than by bolder operations, the trepan ſhould be again applied."

"On the 19th, nothing farther was attempted, than the taking away, with the cutting forceps, three or four carious ſcales. The further extenſion of the inciſions was delayed to the following day; and again the patient paſſed an uneaſy night at the thoughts of the morrow's operation.

"On the 20th, the lips of the inciſion was again diſſected back, and ſufficient ſpace prepared for applying the trepan. During theſe cruel operations, he never moved his head, nor permitted a groan nor a ſigh to eſcape him: The inciſions being completed, the caries was diſplayed, extending from the junction of the coronal and ſagittal ſutures backwards towards the occiput, terminating in a fungous tubercle.

rurgos, etiam venerandum facultatis noſtræ ſeniorem, et tum temporis decanum, Dn. D. Georgium Woſeginium, P. P. ordinarium ſecundum, ut et Dn. D. Philippum Jacobum Hartmannum, P. P. M. extraord. illic offendi: reſoluta itaque per Dn. Auguſtinum Groſmannum (qui et reliquas per curationem totam operationes chirurgicas perfecit) deligatione, in conditionem ſeu ſtatum mali inquiſivimus, quo probe perſpecto, vulnus denuo deligabatur, adhibitis prius (quod etiam in deligationibus reliquis omnibus factum eſt) fomentis.

His peractis, de cura recte inſtituenda conſultabamus, caſum venerando noſtro dn. ſeniore ad artis præſcripta, proponente, qui, quod tum oſſiculum per trepanum primum extractum, tota interiore ſua lamina et ad latus ſiniſtrum, tum et oſſa bregmatis ſuperius magnam partem carie confecta cernerentur, ſub calvaria vero, fungoſa caro, ſuper matre dura expanſa obſervaretur, et neutrius curatio citra exciſionem inſtitui poſſet, de ulterius applicandis trepanis, nobis omnibus aſſentientibus, conſilium dabat.

Die 19. Nihil tentatum, niſi quod tria carioſi oſſis fruſtula, (quæ dn. patienti in manum tradebantur, forcipe inciſoria fuerint abſciſſa. Inciſio vero, ſeu cutis ſeparatio, in diem poſterum differebatur: comedit bene, noctem vero, forſan (ut et ipſe dn. patiens putabat) propterea, quod ſuſtinendorum poſterea die dolorum maximam animo impreſſerat acerbitatem, habuit inquietam.

Die 20. Diſciſſa cute, et inciſionum labiis, cum pericranio a calvaria extrorſum avulſis, pro applicandis trepanis ſufficiens ſpatium parabatur, larga ſubſequente hæmorrhagia, omnes tamen has effrenati doloris vehementias, tam incredibili cum animi robore perpetiebatur, et cohibebat coercebatque intra ſeſe dn. patiens, ut nullas voces indecoras, nec gemitum aut ſuſpirium ederet, imo caput, toto operationis tempore, per ſe, ſine ullius adjumento, adeo immotum tenebat, ut nec latum culmum ſitu ſuo id moviſſe, vere dici poſſit: facta inciſione, in conſpectum veniebat caries, in ſagittali ſutura a coronali incipiens, atque occiput verſus tendens, cum protuberantia in fine ſpongioſa, vulneri magna ſatis linamentorum diſcerptorum, ſeu ſtupæ quantitas imponebatur: per diem ut et noctem, ſenſit dn. patiens, in inciſionum labiis, dolores adurentes punctorios, qui et appetitum proſtraverunt, ſomnum item interceperunt. Sequenti

Die, 21. ſcilicet, iterum convenimus; ſtupa de vulneris medio auferebatur; reliqua vero, in inciſionum extre-

" On the 21ſt, we met again ; the doſſils were withdrawn from the centre of the wound, but not thoſe which were introduced into the extremities of the wound, becauſe they adhered more firmly, and it might have renewed the hemorrhagy, had they been withdrawn. The extent of carious bone being meaſured, was found to be two inches in length ; the patient now recovered his appetite and ſleep, unleſs when tormented with pain.

" His ſurgeon, Groſmann, being on the 22d obliged to leave town, the ſecond application of the trepan was again delayed. He paſſed the afternoon in pain, but was relieved by vinous fomentations.

" On the 23d, the day appointed for operation, there is deſcribed a perturbed and indecent ſcene ; Farver the paſtor, and Aulic-Confeſſor, had anticipated their viſit, was ſtationed by the ſide of the patient, diſſuading him from ſuffering the operation, and was occupied in propounding formal ſyllogiſms, and maintaining long and idle debates with all preſent about the chances of cure, the powers of nature, the pains of the operation, and the dangers of the trepan. But theſe learned diſcourſes were at laſt interrupted by the noble patient, who, after exclaiming, " O God ! ſupport me with your help !" placed himſelf in the chair for operation ; and, turning to the ſurgeon, ſaid, " In the name of God, do with me what is right, whatever you have reſolved." He then exhorted him to perform his opera-

mitatibus puta, quod firmius, et quaſi conglutinata is adhæreret, nec ſine ſubſecuturæ hæmorrhagiæ periculo avelli poſſet, intacta relinquebatur. Horis promeridianis, cariei, in ſutura ſagittali, longitudinem circino dimetitus ſum, quam, ut monſtrat, invenii. Cibum melius ſumpſit, ſomnum etiam melius capere potuit, qui profundus fuiſſet, niſi ob dolorem, ex impreſſione labiorum vulneris, quoquo verſus caput inclinaret, incitatum, ſedendo dormire coactus fuiſſet.

Die 22. Ob Dn. Groſmanni, ſtatim, facta matutina deligatione, iter unius diei rus ſuſcipientis, abitum trepani applicatio adhuc procraſtinanda fuit, a meridie bene habebat, niſi quod quandoque a doloribus punctoriis, alternatim illapſis, mox tamen evaneſcentibus infeſtaretur ; in abſentia Dn. Groſmanni, Dn. Viviani et Fuchs, circa veſperam, fomenta ex vino calido adhibuerunt, oleo roſaceo caput inunxerunt, et deligationem perfecerunt, cœna et ſomnus modicus ſubſequebantur ; hic tamen, ob dictam modo cauſam, aliquoties fuit turbatus.

Ipſe etiam dn. patiens, ſermones noſtros interpellens, in ſequentia erumpebat : (" In Jeſu nahmen, ihr herren, ich hab mich in ihre Gervalt gegeben, ſie machen mit mir, wie ſie es gedencken zu verantworten"). Domini mei, ſubdidi me poteſtati veſtræ, peragite in me, in Jesu nomine, quæ a vobis defenſum iri, confiditis ; atque ſellæ, huic negotio apparatæ, inſidens, dnum. chirurgum, de officio ſuo intrepide exequendo cohortabatur : opus igitur aggreſſi ſumus, atque ſecundum et majus trepanum fuit applicatum, cum ſucceſſu optimo, et ſumma ægri tolerantia, qui nec de ullis conquerebatur doloribus ſolito ; tamen major quantitas ſanguinis, per ipſum trepanum, cum ad diploen deventum eſſet, ad cochlearia tria vel quatuor circiter, ſubſequebatur ; ipſum os exſciſſum vero, firmum ac ſanum, ac valde craſſum, niſi quod aliquo modo, in inferiori tantum lamina, ut monſtrat, carie arroſum eſſet, reperiebatur : ipſum trepani foramen, floridus adimplebat ſanguis, cui linteolum, oleo roſaceo imbutum, atque ſtupa, quantum ſufficiebat, imponebantur.

tions ſteadily and manfully. The work was begun; a ſecond and larger trepan-crown was applied, with little pain to the patient, but with an unuſual profuſion of blood, (which began to flow when the ſaw had reached the diploe), to the extent, indeed, of three or four ſpoonfuls. This piece of bone was firm and ſound, and peculiarly thick, except on its lower ſurface, where it ſeemed eroded by caries. But a pain in the eye of that ſide, which, from the time the perforation was half finiſhed, the patient felt at every turn of the ſaw, forbade the application of a third trepan. He himſelf requeſted that no other perforation ſhould be made at this time; and we accordingly left him undiſturbed. He dined but poorly, from want of ſtrength; at two we met again, to make the third perforation, but refrained from it on account of the pains, which were rather aggravated than relieved. He went to bed ſupperleſs, paſſed an uneaſy night, and it was only towards morning that he had any remiſſion of pain.

"But, on the 24th, the third trepanning was very happily and ſucceſsfully performed; the bleeding from the diploe was equally profuſe; the patient felt no pain from cutting the bone; but the pains of both eyes came on again, from the working of the terebra, and ceaſed the moment the piece was cut out. This piece of bone was in no degree tainted with caries, but ſound without and within. The patient was full of hope and confidence, and doubted nothing that his perfect recovery, and the ſucceſs of our operation, would give the lie to our detractors. He

Ad tertium trepanum progredi, vetabat dolor oculi iſtius lateris, nempe ſiniſtri, quem ſub ipſa terebratione fere dimidia, et ad ſingulas quoque trepani adactiones, dn. æger perſentiebat; tum et, quod differri illud ſi foret poſſibile, ipſe poſtularet, quia ſe viribus ad aliud ex alio ſubſequens, perferendum, imparem futurum putabat; facta itaque beligatione convenienti, inturbatus relinquebatur. Prandium, ob appetitum proſtratum, fuit exiguum. Hora ſecunda promeridiana, ad inſtituendum trepanum tertium conveneramus, quoniam autem dolores oculum vehementiores invaſerant, qui necdum intermittebant, ſed ad qualemcumque; in facto modo foramine, preſſionem, augmentabantur, in craſtinum illud differre, conſultum videbatur: reſoluta faſcia, ſcrobiculus trepani, fluido ſimul et florido ſanguine plenus, inveniebatur, facta itaque debita deligatione, præter quod aliud quid occiperetur, die hac dn. æger ſinebatur; manſit incœnatus, et noctem traduxit inſomnem, quod ingraveſcentibus oculi ſiniſtri infeſtaretur doloribus, qui circa tempus matutinum aliquantum remiſerant.

Die 24. Cum ſucceſſu optimo inſtituebatur trepaniſatio tertia; ſanguinis tamen, pari ut in ſecunda, ubi ad diploen perveniebatur, ſubſequente quantitate, conſtanter pariter hanc ut antecedentem, et ſine magnis doloribus, dn. patiens preferebat; ſub ipſa terebratione tamen, dolores in utroque oculo incidenter affligebant, qui tamen ſtatim, cum operationis ſine quoque finiebantur; gratulabatur ſibi de ſucceſſu bono dn. patiens, ſpe ſubſecuturæ felicis curationis fretus, hinc dextra ſua, meam, ſub ipſa terebratione, prehendens et premens, bene negotium, ad me inquiebat, Deo auxiliante, ceſſurum, et obtrectatoribus noſtris probo futurum, confido: "Ich mercke, es wird durch Göttes Hulffe gut gehen, allen unſern Feinden zu Spott und Schande." Peracte trepanatione, modo

went ſupperleſs to bed, ſpent a painful and fatiguing night, and towards morning was thirſty.

" He requeſted, on the 25th, that we ſhould defer for two days the ſawing out what remained to be cut away: Excepting occaſional lancing-pains in the forehead, he continued well, ate with appetite, and had refreſhing ſleep. On the 26th, the pains of the eyes and forehead returned; and, having ſupped plentifully, he paſſed a ſleepleſs night, but free from pain. On the 27th, ſome of the intermediate pieces of bone were cut out with ſtraight ſaws, ſome fragments were pinched away with the cutting forceps. On the 28th, a ſaw better adapted to the form of the part having been prepared, more bone was ſawed away; drying applications were put to the fungus; his appetite improved; he was chearful; he had a tranquil night, and ſlept a good deal. On the 30th, the ſaws were uſed once more; however lightly

debito deligabatur. Officulum exemptum, nulla carie infectum, ſed lamina ſua tam exteriore quam interiore ſolidum, omnibuſque partibus incorruptum deprehendebatur. Prandium fuit modicum: poſt meridiem, de aliquali ſolum virium imbecillitate conquerebatur; cœna fuit brevis, vel nulla potius; noctem habuit inſomnem, ob dolores, in foramine præprimis ultimi trepani, et circa frontem, perceptos fere continuos; circa noctem mediam circiter quoque ſiti vexatus, adeo ut de decocta ſumere fuerit neceſſitatus.

Die 25. Ut ad bidui ſpatium, in exſcindendo reliquo oſſe, ceſſaremus, petiit, quo tempore vires ſe recuperaturum, ſibi habebat perſuaſiſſimum, quare, deligatione tantumdem facta, quieti relinquebatur; ante prandium ad ſeſqui horæ ſpatium dormivit, ceſſarunt pridie allapſi dolores, et prandit ſatis bene; poſt meridiem ſatis erat vegetus, niſi quod bis terve circa frontem imprimis, pungentes, mox tamen evaneſcentes, perciperet dolores; cœnavit ſatis bene, noctem habuit quietam, nec ullos capitis dolores ſenſit.

Die 26. Mane, capitis dolores, ad oculos et frontem imprimis ingruentes, non tamen diu, (dimidiam horam circiter), durantes obſervabantur; facta fuit deligatio, poſt etiam ſatis bene pranſus fuit. Cœnavit largiter, noctem vero inſomnem fere, ſine ullo tamen capitis dolore, peregit. Operationibus his abſolutis, ſeorſum collocutus mecum dn. patiens, ſe, reliquos dnos. D. D. excepto Dn. Lic. Gottſched, medico tunc ſuo ordinario, abdicaturum, mihi expoſuit, voluitque ut de meo conſilio, reliqua perficeretur curatio, utque ad finem uſque huic præeſſem, a me popoſcit.

Die 27. Serrulis rectis, interſtitia foraminum, modiolis factorum, diſcindere tentebatur, ob ſerrularum autem ineptitudinem, duæ tantum lineæ, ſeu delineationes, pro inſtituendis ſectionibus, accommodiſſima, ductæ fuerunt, leviter tulit omnia dn. patiens, poſt vero, ante prandium, iterum per ſemi horam, ad oculos, capitis ſenſit dolores, pranſus tamen eſt ſatis bene; poſt meridiem bona fuerunt cuncta, ad horam quartam uſque, ubi forcipe inciſoria aliquot fruſtula oſſis, inter primi et ſecundi trepani foramina, exempta, foramina item exterſa, et deligatio facta fuerunt; cœnavit bene, et ſine dolore, cum aliquali ſomno, noctem traduxit.

Die 28. Tam ante, quam poſt meridiem, nihil fere, ob ſerrularum commodarum defectum, præter deligationes, inſtitutum fuit; interim ſatis bene ſe habuit, ſatis bene comedit, atque bene dormiendo, poſtquam ad horam nonam uſque nocturnam, ab amicis et cognatis, ſecum cœnantibus, blandis converſationibus exhilaratus eſſet, ſine dolore, quietam habuit noctem.

Die 30. Serrula iterum adhibita fuit, atque ubi interior quoque lamina perfecta videbatur, quamvis cohæreret

the dura mater was touched with the levators or ſaws, it ſeemed extremely ſenſible, and excited excruciating pains; many parts were now burſt up with the levators, which were carious on both ſurfaces, and throughout. That part of the fungus which protruded through the openings of the parietal bones, was cut off with a blunt ſpathula, without the ſlighteſt perception of pain, while part of the cranium on the right ſide was burſt up with the levator, which, though ſound without, was carious on its internal ſurface: Part of this ſurface yet adhered ſo firmly to the fungus, that, in place of being ſeparated, it was cut away with the forceps, which excited excruciating pains of the eyes, and through all the brain, ſo terrible, indeed, that the patient, who had borne all the moſt painful parts of the operation with compoſure, roared with agony, "Oh, oh, my left eye! in the name of God, what are you doing?" while the blood flowed very profuſely; all that day he ſuffered dreadful pain, but his ſleep was ſweet and refreſhing, without diſturbed dreams. On the 31ſt, the pains returned at dreſſing; two days he paſſed in great fear of hemorrhagy, almoſt depriving himſelf of ſleep. On the 2d of October, the veſſel which had occaſioned this alarm was tied; and this day, as on many of the preceding, he was ſtill tormented with a gnawing pain, (dolorem quodammodo mordicantem); but it ſubſided as uſual towards night, and he enjoyed refreſhing ſleep. On the 5th, a ſmall fragment of the fungus was ſeparated with a ſpathula. On the 6th, it became neceſſary, on account of profuſion of matter, and a degree of fætor, to dreſs twice a-day.

adhuc, vectis per primum trepanum parti ſiniſtræ, ſuper fungo, ſubmittebatur, (ſimulac enim extra fungum, dura mater in ſecundi aut tertii trepani foramine, quam leviſſime tangebatur, intolerabiles excitabantur dolores), ſurſumque pars illa, ad futuram ſagittalem uſque effringebatur, quæ, qua faſciem exteriorem, et interiorem, carioſa plane inveniebatur; poſtea, fungi, quæ per ſagittalem excreverat pars, ſine ulla doloris perceptione, et ſpatula quidem, ſeu ferro hebete, ſeparabatur: pariter et dextra calvariæ pars, vecte elevabatur, quæ extrinſecus, integra, intrinſecus, magna ex parte carie deroſa ſpectabatur, interiori etiam ſua lamina, fungo tam firmiter adnata erat, ut erui non poſſet, et forſice abſcindi eam oporteret, unde dolores acerbiſſimi, et in toto cerebro, et ad oculos imprimis, inducebantur, ut etiam dn. æger, (qui alias dolores quoſcumque per operationes cunctas, inſenſibilis quaſi pertulerat), exclamare cogeretur, ("Ave, ave, mein linckes Auge umb Gottes Willen, ihr Herren, was macht ihr?") Ah, ah, ſiniſtrum meum oculum, per Deum, Domini, quid agitis? ſanguis etiam, ob ſeparationem illam, large profluebat, quare immiſſo prius decocto ſculteti, faſcia imponebatur, atque quo ſanguinis fluxus ſupprimeretur, hac die non ſolvebatur, ſed circa veſperam defenſivum reiterabatur; ſenſit eo tempore immanes, quales toto quatuordecim dierum ſpatio non affixere, dolores, quid ad noctem uſque, donec ſomnus ingrueret, pendurarunt, quapropter cœna etiam modica tantum fuit; ſubſecutus tamen eſt ſomnus bonus et reficiens, abſque ullis imaginibus aut inſomniis; unde mane,

" The opening was now more accurately meaſured with compaſſes; it was of a triangular form, and fully three inches in length. On the 7th, ſome ſmall ſplinters of bone ſeparated at the dreſſing; other ſmaller exfoliations were diſcharged at the dreſſing of the 9th; on the 10th, two more were diſcharged; and on the 11th, two more from the fore-part of the opening; on the 12th, was diſcharged a larger fragment; on the 13th, he had pains of the eyes and temples, which only ceaſed after an hour's ſleep; and on the 14th, one other ſcale was exfoliated. On the 17th, towards night the pains returned, which kept him awake till midnight. On the 18th, he went to viſit ſome friends, and remained till midnight; he paſſed the day without pain, and the following night in refreſhing ſleep. He was now dreſſed with dry dreſſings only. On the 20th, ſtill, another ſcale of bone came away; on the 21ſt, he had his ſiſters and friends to dine with him. The granulations were now ſeen riſing faſt in the firſt trepan-hole, and an exfoliating piece of bone was pulled away with the forceps.

" But of leſſer exfoliations, laxative pills, anodyne draughts, and refreſhing or ſleepleſs nights, there is no end in this narrative, as there are no bounds to the encomiums of the patient's conſtancy and fortitude, nor any moderate limits to the auguſt titles which the noble patient, and all his relations and friends, collateral and direct, barons and baroneſſes, are decorated. I muſt conclude with ſaying, that, on account of the ſoftneſs and apparent fungoſity of the growing fleſh, they were obliged to touch it occaſionally with cauſtics. During all the month of December,

Die 31. Satis alacer reperiebatur, facta fuit conſueta hora 8va deligatio, præmiſſa inunctione decocti ſcultetiani: poſt deligationem, non leves iterum illapſi ſunt dolores, ad prandium uſque, durantes, qui tamen intra prandendum, quo cibus, in ſatis magna quantitate acceptus fuit, evanuerunt, ita ut horis promeridianis, dnum. ægrotum ſatis vegetum invenerimus: ad veſperam, iterum capitis dolores perſenſit, ad ſomnum uſque affligentes, unde cœna exigua, et ſomnus interturbatus ſubſecutus; nocte in media, ſatis vehemens, exorta fuit hæmorrhagia, ut pro coercenda ea, dn. Fuchs chirurgus, qui iiſdem in ædibus commorabatur, fuerit accerſitus.

Die 1. Novembris, ſoluta ligatura, ad finem ultimæ inciſionis, in ſiniſtro latere, ſub inciſione, diſſecta prominens vena hunc effudiſſe ſanguinem, reperiebatur, quod tamen, ab ipſa inciſionis die, nondum contigerat: impediebat hæmorrhagia hæc, quo minus apertura debite extergeri poſſet, et carptis filamentis obturari poſtulabat, facta itaque fuit cita deligatio, prandium habuit mediocre, aliquales tamen, non adeo vehementes vero, capitis dolores ſenſit, cum aliqua virium imbecillitate: poſt veſpertinam quartam, inſtituebatur deligatio, ſiniſtro tamen latere relicto intacto, ob hæmorrhagiæ metum, adhibendo decoctum ſculteti; cœna fuit mediocris, ſubſequentem etiam veſperam et noctem ſine doloribus tranſegit, ſomnolentus quidem, ſomno tamen ſe non dedit, ob hæmorrhagiæ metum, quia caput ſiniſtrorſum lecto imponere metuebat, donec primo diluculo, ſuadente chirurgo Fuchſio, (qui, capite inſpecto, nullum erupiſſe ſanguinem invenerat, in ſiniſtrum latus ſe inclinaret, et ſub ejus cuſtodia bene dormiret.

the progreſs of the wound was regular, and his re-convaleſcence was uniform and rapid. He had only one reſtleſs night, that of the 7th, and it was occaſioned, not by his own ill health, but by his anxiety for a friend, who, upon ſeeing the wound at one of the dreſſings, was ſtruck with horror, fainted, and fell back. He ſuffered no interruptions, but what were occaſioned by ſlight imprudences; nor any diſtreſs, but from a violent cough, occaſioned by late viſits to the baroneſſes and barons. On the 17th, he took an airing for ſome miles in a cloſe carriage; one ſmall ſcale was diſcharged on the 20th. The laſt of December, the day of his final cure, and the laſt of the year, he ſpent with becoming ſerioufneſs, in religious duties, in giving thanks to God for his miraculous recovery; the next he ſpent in the feſtivities of the ſeaſon without reſtraint, and without harm; and, having returned home on the 30th of January, continued to enjoy the moſt perfect health."

I have tranſlated thus, faithfully, a caſe which has often been the ſubject of comments, a caſe much miſunderſtood, that being deſcribed as a fungus, which is plainly a caries of the ſcull. This long and intereſting narrative carries with it very important pathological facts. It is a caſe ſolitary almoſt in the records of our ſcience, and the ſucceſs of theſe rude but neceſſary operations, in which a ſpace of ſix inches circumference was cut out of the ſcull moſt fortunate. You will have remarked, as I deſcribed in ſucceſſion to you, the ſeveral phenomena, —the extreme cold, ſucceeded by immediate heat,—the ſudden pain,—the ſlow progreſs of the diſeaſe,—the extent of the caries,—and the inſignificancy of the fungus. I am not ſorry to have tranſlated, for the firſt time, this narration from the Gothic

Die 2. Facta fuit deligatio, impoſito venæ in ſiniſtro latere, (quæ tamen nullum ſtillaverat ſanguinem), pulvere ſtyptico: malum alias in eodem inventum fuit ſtatu, niſi quod ſupra denudatum os frontis; et in ſecundo tertioque trepano, rubicunda puncta, (novæ recreſcentis carnis primordia), ſparſim conſpicerentur: prandium habuit largum, totaque die bene ſe habuit, veſpere ingruente tamen, in ipſo malo, quodammodo mordicantem ſenſit dolorem; cœnavit mediocriter, et quietam, ſine doloribus, habuit noctem.

Die 3. Sine doloribus, alacer, totam peregit diem, probe prandendo ac cœnando. Mane, et ſic unica tantum vice, die hac, recenſito jam modo, fuit facta deligatio, (funda galeni dicta), noctem, bene dormiendo, tranſegit, licet etiam aliquoties expergiſceretur, ſtatim tamen iterum obdormivit.

Die 4. Tota die, cuncta bene geſta, præterquam quod poſt deligationem, per horæ fere ſpatium, dolores capitis non adeo leves, ſenſerit: una facta deligatio; per tuſſim aliquoties a ſomno, qui ſatis quietus fuerat expergefactus.

Die 5. Modo priſtino et tempore conſueto, facta fuit deligatio; fruſtulum etiam fungi, obtuſo quidem inſtrumento, ſpatula nempe, ſeparabatur, quo facto, ſanguis ſtatim profluebat, et doloribus, levibus ſaltem, iiſque paucis, ad oculos decumbentibus, afficiebatur: alias omnia bona, niſi quod tuſſis continuaret. Circino obſervavi longitudinem interſtitii extremarum orarum, primi et ſecundi trepani ſignatam.

Latin in which it is told; it is a caſe of caries in the ſcull, as nearly parallel with that of the boy's tibia, proceeding from cold, as can be imagined, and well calculated to demonſtrate the ſudden effects of cold ſeconded by heat and fever upon the ſtructure of a bone.

Firſt, a ſtrong and vigorous man, travels poſt by night, in weather intenſely cold, and though inured to ſervice, in Brabant, with the army, he feels all its intenſity, and aſcribes to it all his diſtreſs. He arrives at his houſe, and is received in rooms heated, after the German manner, with ſtoves; and there having hardly embraced his friends, he is ſtruck with a ſudden and violent pain in the head; and, I doubt not, had the detail of his caſe been very perfect, we ſhould have found, that, like this herd-boy, he had paſſed the firſt night in feveriſh dreams, and great diſorder. During ſeven weeks, the pains are unremitting and torturing; and while the bone was thus inflamed, ſurely the dura mater could not fail to ſeparate from it; the moment the pains ceaſe, the vertigo is perceived, which marks the exact period of this kind of danger. The pains return, his whole ſcalp ſwells, and then by ſuppuration the ſwelling becomes limited to the part affected, to the region of the carious bone. Again, at the diſtance of fourteen days, the puffy tumor riſes;—the ſcalp is plainly detached from the deadened cranium;—the tumor ſubſides, but the ſore never heals;—the bone, covered by fiſtulous integuments, diſtils a ſerous humour; and we have every reaſon to believe, that when the integuments are no longer able to hold connection with ſuch diſeaſed bone, the dura mater, on its internal ſurface, cannot remain ſound. This caries, then, or febrile necroſis of the ſcull, is plainly the original diſeaſe: The ſeparated dura mater might well put on (in this ſeparated ſtate) a diſpoſition to generate fungus: Yet, when, after a year's ſuffering, and innumerable conſultations, the phyſicians and ſurgeons reſolved that the trepan ſhould be applied, when a great circle, of ſix inches of circumference, is cut away, there is, in proportion to this extent of caries, a fungus ſo inſignificant, that except ſome ſlight aſtringents, ſoaked in Malmſy wine, and (towards the end of the cure) ſome ſlight applications of the cauſtic, we hear nothing of the fungus; it is adventitious only; it does not protrude through the ſcull, nor, though cut down, does it grow up again like a true fungus, in one night; it wants every eſſential character of fungus; it reſembles nearly the vigorous granulations of a healthy but ſuppurated dura mater; and heals ſo equally along with the bone and integuments, that we are no more entitled to deſcribe this as a fungus of the dura mater, than as cancer of the brain.

OF SUPPURATION OF THE BRAIN, FROM WHATSOEVER CAUSE IT PROCEEDS, WHETHER FROM LACERATION OF THE INTEGUMENTS, SEPARATION OF THE DURA MATER, OR CONTUSION OF THE SCULL,—OF THE SIGNS OF DANGER, AND THE PROPER TIME FOR OPERATING,—WITH AN ANALYSIS OF THE OPINIONS AND PRACTICES OF THE MOST ABLE PHYSICIANS AND SURGEONS ON THIS IMPORTANT QUESTION.

You will now perceive, that contuſions of the cranium lead naturally to one of two forms of diſeaſe; either to a mere exfoliation, a diſeaſe limited to the bone, and long protracted, yet in no period void of danger; or a preſent affection of the dura mater, penetrating in a few days to the brain itſelf, and followed by very ſudden death. If, in demonſtrating to you the various affections of the lacerated ſcull, ſeparated dura mater, and contuſed bone, I have treated individually and diſtinctly of affections which are oftener combined, it is with the purpoſe, firſt, of proving, that they do happen independently of one another; and, ſecondly, of accuſtoming you to reaſon correctly on the individual facts; and teaching you to diſtinguiſh the peculiar conſtitutions and affections of each part, ſo as to be able to foretell the dangers reſulting from each particular injury. But theſe parts having one common circulation, and a mutual ſympathy and dependence, it cannot be but that, in moſt caſes, the blow which affects the bone, by contuſion, muſt ſhake the dura mater, and deaden the integuments, and produce, by this complicated injury, ſymptoms different in complexion, (and more immediate in their conſequences), from any I have yet deſcribed. I have deſcribed chiefly that form of contuſion, where, along with a mere caries, there is a ſlow ſeparation of the corrupted bone, and little danger; but not that where the period is ſhort, where the ſymptoms immediately follow the injury; where, though there is no external wound, nor apparent bruiſe, to intimate the patient's danger, there riſes, after a few days of ſhiverings, and indeſcribable confuſion of head, a puffy tumor, the ſureſt mark of danger, and where in a few days more the brain is deeply affected, and the patient dies. I am now to explain to you the principles on which this caſe is to be reſolved, the rules and data, according to which a conſultation, the moſt ſolemn and intereſting in our profeſſion, is to be conducted: The confuſion of head, ſhivering, and fever, are all too ſlight for the patient to feel, or his friends to apprehend, or any but his ſurgeon to eſtimate juſtly the danger of his ſituation: The ſymptoms are too ſlight to allow the mention of an operation, eſteemed the moſt hazardous in ſurgery, which yet muſt be imme-

diately performed, elſe the man is loſt without redemption. Not one among you, perhaps, is deſtined ever once in his life to perform lithotomy, but there is not one of you who will not be daily called upon, in future practice, to decide upon the moſt difficult of all queſtions reſpecting injuries of the head;—to deliver before a jury a ſentence on life or death;—to proclaim the motives and principles of your practice, your reputation being involved in the fate both of your patient, and of the criminal accuſed of his death. The phenomena which I have hitherto deſcribed, are chiefly thoſe of caries, affecting only the bone, protracted for months or years, and often void of danger. But the train of ſymptoms I am now to deſcribe, are thoſe from which danger is inſeparable.

A man, in a quarrel, or in a riot, is knocked down with a brick-bat, or bludgeon. He is, perhaps, only ſtunned by the blow, and does not fall down: he is ſickened, faint, cold, and pale, but in a few minutes he feels quite recovered: often a blow apparently more terrible, is harmleſs: but whatever may be the force, there is unhappily no criterion of the effect of ſuch a blow. Though a patient thus hurt is apparently well, and goes about his uſual occupations, he feels a depreſſion of ſpirits, and a confuſion of head,—a want of appetite, and loathing of food: He is in a faint, languid, and nervous condition: his hands tremble, and his head ſwims upon being hurried in exerciſe, or diſturbed with any unuſual emotion, and he paſſes the night in unquiet ſleep, and terrifying dreams, from which he wakes in indeſcribable confuſion, from time to time. In a few days, the part injured, though at firſt it was hardly livid, riſes into a puffy tumor, round, ſoft, regular, circumſcribed; important, only as it is connected with theſe ſigns of danger, and as it implies a detachment of the dura mater, and contuſion of the bone.

In a few days, the fever is more conſpicuous, (though perhaps the tumor is flattened), with ſlight horrors and ſhiverings; the confuſion is more diſtreſſing, attended with pain, and a ſenſe of girding in the head; he can no longer endure the light; the eyes are red, ſwollen, and gummy, (the oculi ſubpingues of the ancients); the pulſe is quick and weak; the tongue foul; the ſkin parched; the viſage pale and ghaſtly, with a hectic fluſh upon the cheek; the urine pale, and ſparing in quantity; the hands, and the tongue, when he puts it out, tremble. He knows not what ails him, but is night and day in a ſtate of indeſcribable confuſion. During the night, roving, grinding the teeth, and ſlightly delirious; and during the day, deſponding, oppreſſed, and ſick.

If the ſurgeon be fully aware of the import of theſe ſlight, but alarming ſigns, he opens this puffy tumor with the ſcalpel, and finds the bone dry, and whitiſh, or inclining to yellow. He knows by the aſpect of the pores, which are the holes by which the arteries enter it, that it is dead. He applies the trepan, and upon taking out the piece, finds that there is a ſlight coating of cream-coloured pus upon the dura mater, and congratulates himſelf, not without reaſon, on having anticipated the danger, and ſaved his patient's life; for uſually the ſymptoms ſubſide after perforation, the dura mater reddens, granulates, and heals along with the ſcalp, with which it unites in one common cicatrix.

But, if the patient be regardleſs of theſe ſymptoms, unconſcious of his ſituation, or indifferent to the intreaties of his ſurgeon; if any how this happy interval be neglected, the ulcer, which was in this ſtage confined to the dura mater, extends to the brain. The confuſion of head, and fever, increaſe; the patient becomes ſtupid, and drowſy, and weakens from ſleep in great confuſion and alarm. He has longer ſhiverings, and more continual ſickneſs; his knees totter under him, his hands tremble, and his face is often ſlightly diſtorted with ſpaſms; and his limbs, eſpecially of one ſide, are often ſlightly convulſed; and growing gradually weaker, he ſometimes becomes paralytic of one ſide, but uſually becomes only more ſtupid, and oppreſſed, and ſuffers ſlight convulſive paroxyſms before he dies. During the firſt eight or ten days, he is in this ſtate of languor and ſickneſs; from the tenth to the twentieth, he is in manifeſt danger; and uſually before the twentieth or twenty-fifth day, he expires.

The nature of this puffy tumor, and the ſad preſages to be drawn from it, are now plain to you. The blow which contuſes the bone, deadens the ſcalp, and that ſurface which is next the cranium, is chiefly affected, in conſequence of the hard reſiſtance of the bone: The ſurface of the ſcalp, in contact with the contuſed ſcull, is gangrenous, and thence the tumor is enphyſmatous, ſoft, uninflamed: The deadened part being limited, gives a circular form to the tumor; by the extravaſation of blood, and inflammatory thickening of the ſurrounding parts, it is circumſcribed; and by its relation to the contuſion of the bone, and the probable ſeparation of the dura mater, ſuch tumor becomes the moſt infallible ſign of danger. Nor is it to be doubted, that ſuch puffy tumor ariſes from the contuſion of the bone, and the bruiſing of the ſcalp; for the ſeparation of the dura mater will not cauſe it. Often have I ſeen the patient, who had great effuſions of blood betwixt the ſcull and dura mater, lie for days or weeks oppreſſed and unaſſiſted; but never have I ſeen ſuch ſeparation of the dura

mater marked with puffy tumor. I have here deſcribed the moſt common courſe of the proceſs, which uſually laſts fifteen or twenty days before it affects the brain, and is ſo uniformly the conſequence of contuſion, as to make the examples I have lately laid before you, of ſymptoms delayed for months, mere exceptions to the general law. The uſual inference, though not univerſally, is generally true, " That the danger ariſing from contuſion, or wounds of the head, muſt appear before the fortieth day." The rules which nature points out for our conduct are ſo very plain, that, had nothing been written on the ſubject, I had found little now to write. But every doubt muſt be removed from your minds, and your direct line of conduct aſcertained by authority, as well as pointed out by reaſon. If there be a caſe which the ancients underſtood, it was this of ſuppuration of the brain, proceeding from a contuſed bone. From the nature of their arms in fighting hand to hand, from the partial warfare of innumerable rival ſtates concentrated in a narrow peninſula, they had ſo many opportunities of obſerving the ſtages by which a blow becomes fatal, that all the circumſtances of the contuſed bone, ſhiverings, fever, and other ill ſigns, were perfectly underſtood; and long before books of ſcience were written, or opinions and ſyſtems began to be perplexed, Hippocrates had announced, in the form of a ſimple aphoriſm, thoſe facts which we labour, through many pages, to prove, and find it difficult to bring back to the ſimple truth. " When the cranium, (ſays Hippocrates), fractured, contuſed, or otherwiſe injured, is neglected, and neither raſped on its ſurface, nor perforated, as needing no ſuch care, the fever appears in ſummer on the 7th, though not in winter till the 14th day. Thus, the bone ulcerates, changes its colour, and diſcharges a thin ſanies; and, being inflamed, it naturally periſhes, becomes yellow or livid, as if ſoaked in brine; and when it becomes thoroughly corrupted, grows firſt intenſely black, and then white again. Some, having gangrene of the brain, periſh in ſummer on the 7th, in winter by the 14th day. Wherefore, when you perceive the acceſſion of this fever, accompanied with other threatening ſigns, you muſt make no delay, but either ſcrape the ſurface, or perforate the bone through to the dura mater *."

* " Quum quis os fractum, aut ruptum, aut contuſum, aut quocunque modo fractum intelligens, per errorem deliquerit, et neque raſerit, neque perforaverit, veluti os non opus habeat, et velut os ſanum exiſtat; ante decimum quartum diem febris corripiet ut plurimum in hyeme. In æſtate vero poſt ſeptimum diem febris corripit; et poſtquam hoc factum fuerit, ulcus colorem amittit, et ex ipſo ſanies pauca fluit; et quod inflammatum eſt ex ipſo emoritur, et viſcoſum fit, et apparet velut falſamentum, colore fulvum, ſublividum, et os tunc corrumpi incipit, et ſit valde nigrum, poſtremum pallidum aut valde album evadens.

Archigenes deſcribes in like terms the condition of thoſe who have the dura mater inflamed: "Ex læſis membranis apparet, ideo, enim febres cum horrore accedunt, faciei rubor, et calor longe major, quam pro febris modo, ſomnique tumultuoſi, oculi ſubpingues, et gramioſi, et rubentes; ulcus neque alitur, neque pus maturat, et ſordidum fit. Nonnullis et in lingua puſtula oboritur. HIS UBI CITO MANUS ADMOVEATUR, SPES ALIQUA SUBEST SALUTIS, UBI SERIUS PLERIQUE OMNES MORIUNTUR." "When the dura mater is inflamed, then come ſhiverings, and fever, and fluſhings of the face, quite diſproportioned to the degree of fever; diſturbed ſleep; eyes heavy, ſwelled, and gory; a ſore, flabby, and foul, with ill-digeſted pus; ſometimes puſtules cover the tongue. *Thoſe who are ſpeedily aſſiſted have ſome chance of ſafety; but when help is even but a little delayed, they almoſt always die.*"

Theſe conſequences muſt have been long obſerved before they were recorded: theſe concluſions, ſo very important in practical ſurgery, have ſtood uncontroverted for three thouſand years. The various ſtages of death in the ſcull, are marked by the ancients with ſimplicity and preciſion, as becoming firſt dry, then yellow, or livid; and when thoroughly corrupted, entirely black, or black verging again towards a dead whiteneſs: thus we are led back to that ſound and judicious rule which I have delivered to you in the words of Fallopius: "Woe to the patient whoſe ſurgeon waits for the blackening of the bone." In caſes of fracture, there may, indeed, be doubts: the danger is eventual, the operation merely preventative. Fracture may cauſe a ſuppuration of the brain and membranes at ſome future period; but contuſion is the diſeaſe itſelf, it is the actual ſuppuration of the brain, announced by infallible ſigns. Of all the caſes in ſurgery, this is the leaſt equivocal. Of thoſe who have fractures of the ſcull, many even in the moſt alarming circumſtances ſurvive unaſſiſted; but in contuſion, followed by ſuppuration, unleſs the ſcull be perforated, unleſs the abſceſs be opened, all muſt die.

Hippocrates refers, in all his caſes and repreſentations, to war and weapons; and ſuggeſts, with that ſagacity for which he has been famous, that we ſhould watch with peculiar care thoſe who are ſtruck with greater violence, and eſtimate the danger of the contuſion according to the force of the blow: "Rumpitur autem os

Sunt autem et qui ſyderati fiunt, atque ſic pereunt ante ſeptimum diem in æſtate, aut decimum quartum in hyeme. Quapropter ubi intellexeris febrem invadere hominem, et ex aliis ſignis aliquod ipſi accedere non cunctari oportet, ſed os uſque ad membranum perforare, aut ſcalpro raſorio deradere."

et obſcuris fiſſuris et manifeſtis: et contunditur obſcuris contuſionibus: et intro ex ſua maxime cedit, quum alter ab altero ſauciatur, *de induſtria ſauciare volens:* aut quum *ex altiore loco* ſit jactus,—aut plagæ ictus, uter tandem fuerit, magis quam ex plano loco:—et ſi *contineat manu* telum, *ſive jaceat, ſive percutiat;* et ſi *fortiorem debilior vulnerat* *."

"T. a big groſs man, of about thirty years of age, was (upon I know not what quarrel, but I believe in defending a little boy who had been abuſed) knocked down with a brick-bat. The fellow who had abuſed the boy, and then revenged himſelf upon the innocent man who interpoſed, was notorious for his ſavage diſpoſitions, and for ſuch uncommon bodily ſtrength, as to leave no apology for his lifting any thing like a weapon. He lifted half a brick, and, ſtanding on a ſtair to which he had retreated, threw the brick with all his force, and hit T. on the head a blow which felled him to the ground. He lay very long inſenſible, for the ſpace of a day and a night, in his own houſe, ſo that had we ſeen him at this period, we might have apprehended ſome burſting of blood-veſſels, and extravaſation within; but he revived, recovered his ſenſes entirely, found the cut on his head very trivial, and would have returned to his trade, but for that indeſcribable ſickneſs and languor which hung about him, without any remarkable ſymptoms, to the hour of his death.

"Deep as the ulcer had penetrated into the brain, and early as the ſymptoms began in this man, they were all along very ſlight. He had hardly recovered from the inſenſibility, when the ſhiverings commenced. On the 3d day he had frequent fits of ſhivering, of a quarter of an hour's duration, followed by heat and thirſt. A purge (which I preſcribed on the 4th) of jalep, and muriate of mercury, operated ſmartly, and relieved the pains in his head. Next morning, I found the vertigo, headachs, and tenitus aurium, almoſt gone, and he felt nothing but a degree of weakneſs, and languor, and diſturbed ſleep. On the 6th day, I found this giddineſs, languor, and pain, increaſed, but again relieved on the 7th, by the operation of a ſecond purge; and, on the 8th, he mentioned but ſlightly the pain of the head, and ſeemed chiefly diſtreſſed by the debility and languor. In this ſtate did I watch him carefully, the headachs being relieved, but the languor increaſing, till the 10th day, when, beſides the oppreſſion and languor, he felt ſickneſs,—an increaſe of the headachs,—long-continued chillneſs and horrors,—a degree of confuſion during the night; and he awakened, not as from a refreſhing ſleep, but oppreſſed in an unuſual degree, with a hot ſkin, and a fretful pulſe; and he had that degree of

* De Cap. Vuln. xii.

conſtipation which I know not whether to aſcribe, in ſuch caſes, to ſudden confinement after a ſtate of health, or to an incipient ſtate of paralyſis, which affects always, I obſerve, the viſcera, before it ſenſibly affects the limbs. By a repetition of the purge, his confuſion of head, and ſickly feelings, were again abated, and ſomething of chearfulneſs and content was viſible in his countenance. He remonſtrated ſtrongly againſt the cutting off of his hair, under pretext of the ill effects which he had always experienced from cutting his hair, which infallibly, he ſaid, produced headachs; but really, I believe, for fear of this being but a prelude (as it was indeed deſigned) to ſome operation.

" The ſmall wound was now puffy and livid; the adjacent ſkin began to be undermined, and the probe, when introduced, ran along ſome extent of naked bone. The pulſe had riſen beyond a hundred, the tongue was white, the belly ſtill coſtive, and the night of the 14th he paſſed in a ſleepleſs perturbed ſtate, ſucceeded in the morning with headach, a permanent ſenſe of coldneſs, ſenſibility to light, and that character, in his features, and in all his motions, of oppreſſion and extreme languor, which is inſeparable from a ſuppurating brain. An uninformed perſon would expect ſuppuration of the brain to be marked by convulſions or delirium, while one at all acquainted with ſuch ſcenes knows, that it is diſtinguiſhed only by extreme weakneſs, not by the violence, but by the total abſence of ſymptoms. The man knows not what ails him; the ſurgeon perceives his condition, but the patient hardly complains, unleſs it be of ſighing, oppreſſion, ſlight confuſion of head, ſhivering, with a feeling of coldneſs at the acceſſion of each febrile paroxyſm, and trembling of the hands, and tottering of the knees, when either his mind is alarmed, or he endeavours to exert his ſtrength.

" This man I had deſtined for the knife, conſcious that no earthly power could ſave him, if that ſuppuration was allowed to come to maturity, which was plainly begun. But he was reſerved for a different fate; for the natural courſe of rotation of the hoſpital having delivered him into other hands, I met him wandering in the cold ſtairs of the hoſpital, his eyes indeed open, but his ſenſes gone, at the moment he ſhould have been under the operation of trepan. On the 13th day, an inciſion had been made, ſo as to prolong the cut on his head, and expoſe the naked part of the ſcull, which was nearly on the top of the head, cloſe by the ſagittal ſuture. The bone was bare, and was known to be ſo for many days; but it was not ſuppoſed dead. The inciſion healed, or ſeemed at leaſt in a healing condition; and for his ſickneſs

effervefcing draughts were prefcribed. He continued, with ſlight variations of pulſe, countenance, and intellect, in the ſame ailing condition, from the 13th to the 17th day; but his vomiting was now ſevere; his rigors laſted ſometimes half an hour; his complexion was wan; his features contracted and pinched; his eye heavy and melancholy; his fever increaſed, and his pulſe beating 112; and though generally feeble, it was ſometimes very ſtrong: Even in the hour of viſit, his vomiting was ſo inceſſant, his ſhiverings ſo violent, and his pulſe at the ſame moment ſo weak and trembling, that it could not be felt. On the 18th, the confuſion of head, the ringing of the ears, the fever and ſhiverings, and all the marks of diſorder, were ſo much increaſed, that the operation could be no longer delayed, but unhappily, the man was, by eighteen days of ſuffering, reduced ſo very low, that the chance of his being ſaved by it was indeed very ſlight. Upon perforating the ſcull, a profuſion of ripe pus flowed from the trepan-hole; and he was committed to bed, where he paſſed an indifferent night. In the morning, though no ſhiverings were reported, he was chill; and, in place of the oppreſſed and dejected countenance which he had before operation, his looks were wild, and his pulſe extremely rapid.

" On the ſecond day after the operation, the dura mater looked black and ſloughy, the diſcharge fætid, the matter continued to flow profuſely from the trepan-hole; yet his looks had changed again from wild and diſtracted, to oppreſſed and anxious; the ſhiverings, he ſaid, had ceaſed, becauſe he had refrained from cold drinks, but his head was ſadly confuſed. On the 3d day he fell lower; his ſenſes were perfect, but his looks expreſſed unſpeakable diſtreſs: the matter was brown, thin, and fætid, the wound dry and glazed, the ſkin hot, and the pulſe feeble and quick, and the breathing oppreſſed: without having ſhiverings, he had frequent chillneſs; with leſs feeling of pain in the head, he has a miſerable feeling in every part of his body. By the 4th day, he had fallen extremely low; the univerſal uneaſineſs ſeemed very diſtreſſing; his pulſe extremely weak; his voice feeble; his features ſhrunk; he never ſlept, but moaned and toſſed continually. On the evening of the 5th day, after a ſevere ſhivering, he ſweated profuſely; his features ſhrunk perceptibly, his pulſe was extremely quick, his extremities cold; the night was paſſed in great diſorder; he ſtruggled to get out of bed, and towards morning fell low, and expired."

The affidavit which I preſented on this occaſion to the magiſtrates, I have unfortunately loſt. But in this caſe, I have given a faithful picture of a condition of

the ſyſtem which I have often obſerved and watched, from the ſlighteſt glimmerings of danger, to the laſt fatal ſtruggle of delirium or convulſive tremors. By this inſtructive caſe, you are taught at once the ſlightneſs of the ſymptoms, —the danger inſeparable from theſe phenomena of ſhiverings and puffy tumor combined,—the deadly ſuppuration that infallibly lurks under a dry and diſcoloured piece of cranium,—the folly of delaying, till deadened bone degenerates actually into black caries! and you are now conſcious, that though the fate of the patient is terrible, the ſymptoms are not ſo: that the moſt deadly and deciſive are, debility, anxiety, ſhiverings, and ſlight confuſion of head: that to wait for ſymptoms is to wait for death, for the firſt ſlight convulſion, or decided delirium, is the immediate forerunner of death.

The caſe I am now about to lay before you, is of a very different complexion. "Elizabeth Barrow, a woman of the moſt diſſolute life and manners, about thirty years of age, was knocked down in the dark, in a drunken tumult, with a candle-ſtick, poker, or ſome ſuch weapon, but immediately recovered her ſenſes, and continued in health.

"The blow ſhe had received was near the vertex, upon the corner of the parietal bone, and not far from the ſagittal ſuture; and there roſe over the contuſed part a circular tumor, not exactly a puffy tumor, but rather aneuriſmal, containing blood. For ſix weeks the tumor was ſtationary, and the woman, though weakly, and having pains in the head, was without any formal complaint. Perhaps there is no greater mark of a diſſolute life, and vicious diſpoſitions, than a diſregard of health; and this woman ran her uſual courſe of vice and wickedneſs, undiſturbed with any thoughts concerning her health, till febrile paroxyſms and pains of the head forced her to apply to a ſurgeon, who opened the tumor, which was then of the ſize of a hen's egg, with the point of a lancet, and it diſcharged chiefly blood. But the puncture ſoon cloſed, matter gradually collected, and the tumor was ſoon of its original ſize. In a month more, it was again opened, and diſcharged blood mixed with matter, healed again, and again formed.

"The tumor was pointed, and about half the ſize of a tennis-ball, ſoft, puffy, and little elaſtic. The centre ſoft and fluctuating, the circumference hard, firm, and bulging; the bottom ſolid, and giving that very peculiar feeling, by which we are apt to be deceived, in recent extravaſations of blood; it felt as if the tumor covered a very remarkable depreſſion of the ſcull. Upon laying it open with free inciſions, the matter which flowed was thick and purulent,

much mixed with blood; one of the arteries of the ſcalp bled profuſely; the bone was felt rough and ſcabrous to a great extent, and from part of its ſurface a looſe fungous growth, ſo looſe that you could puſh the point of your finger through it, protruded into the cavity of the abſceſs. In theſe circumſtances, how to proceed was indeed a queſtion of delicacy. In a recent contuſion, with even the ſlighteſt of theſe ſymptoms, where there was, with occaſional ſhiverings, a naked bone at the bottom of a puffy abſceſs, the rule would have been expreſs. But this woman was in apparent health; much time had elapſed without any ſigns of danger; the bone might be carious merely on its external ſurface, and might exfoliate, or might granulate, (as indeed it did in the end granulate): There could be no apology for precipitate operation; there ſeemed to be time for reflection; the perforation of the cranium was accordingly deferred.

"But ſhe had been induced to preſent herſelf to the ſurgeons, from having headachs, ſometimes ſevere, with confuſion of head, chillneſs, and fever-fits, which were very diſtreſſing; ſhe was at the ſame time ſo nervous and alarmed, and her ſufferings altogether ſo great, that ſhe received with pleaſure the firſt propoſal of an operation. The catamenia, which had diſappeared after the blow, were now flowing, but were ſuddenly ſtopped with an increaſe of headach, a coſtive belly, a hot ſkin, and a febrile pulſe, counting always above 100. On the 4th day of putting herſelf under our care, the inciſions being already very free, the operation of trepan was performed by Mr Lawſon, who made his perforation near the ſagittal ſuture, and on the anterior part of the caries, through a very unuſual thickneſs of bone: but the bone was in part alive; a great profuſion of blood flowed from the cancelli; and the moment the inner table was divided, and before the perforation was complete, matter ſpouted up in great profuſion by the ſides of the ſaw.

"The night following the operation, the patient was reſtleſs and feveriſh, for, upon opening an abſceſs within the ſcull, as in opening one in any part of the body, the fever and nervous ſymptoms, hardly perceptible before, became very conſpicuous. Though the wound looked well, the head was in confuſion, and ſhe became extremely ſenſible to noiſe or light. The ſucceeding night was calm; and the headach, which was violent the firſt day, was relieved by reſt and quietneſs on the ſecond. The flow of matter from the ſurface of the dura mater was good and copious, and its ſurface began to granulate.

"Even on the 5th, I found her complaining of great depreſſion of ſpirits, nauſea, and ſickneſs, and great pain of the head; but, by the prudent uſe of glyſters

of opiates, and a little wine daſhed with water, the ſickneſs abated in two days, the wound contracted apace, the pus was thick and well-formed, the ſurface of the dura mater was vermeille and granulating. By the 8th day, the margins of the trepan-hole were red and fleſhy, and the whole ſurface of the diſeaſed ſcull was covered with a rich pile of granulations. In about twenty days more, the wound was contracted; the cicatrix of the ſcull, ſcalp, and dura mater, conſolidated; and the woman perfectly cured in ſix weeks *."

Without any ſuggeſtion on my part, you will reap every advantage from the contraſting of this with the preceding caſe, and learn by experience he duty of watching with extreme ſolicitude the ſlighteſt changes of the eye countenance, or pulſe; the ſlighteſt ſhiverings, oppreſſion, or ſickneſs, in thoſe who have this contuſion of the ſcull. From what extreme danger this woman was ſaved, I need not, at this ſtage of our inquiry, repreſent to you;—the matter came up from betwixt the teeth of the trepan while working, and ſpouted from the orifice the moment that the ſawed circle was poiſed up. O'Halloran ſays a thing at once untrue and diſcouraging; untrue at leaſt as a general aphoriſm, and diſcouraging, ſince it tends to make us indifferent to the moſt intereſting queſtion in practice, and to the condition of many who might be ſaved: "In the courſe (ſays O'Halloran), of many years practice and careful obſervation, I cannot give myſelf credit for a ſingle cure I ever performed in this way, (by trepanning), *when the ſymptoms of depoſit were formed; for whether the patient was or was not trepanned, the ſcene cloſed with death.*" This does but prove the culpable delays even of this good practical ſurgeon, forewarned as he was of the dangers of matter being formed; and demonſtrates to us, that thoſe who die are loſt by temporiſing and timid counſel; indeed we have ſome conſpicuous proofs of that operation, which ſhould have ſaved the patient, being unwiſely relinquiſhed after being ſucceſsfully begun. "A boy, (ſays Slevogt), going to ſchool, was ſtruck with an unripe pear on the top of the head, fell down ſenſeleſs, and was carried home, where he lay from morning to mid-day ſenſeleſs, vomiting, and oppreſſed. When he recovered his ſenſes, he pointed with his hand to the in-

* This woman, who made no ſecret of her vicious life, or ſyphilitic taints, had a new ſuppuration over the trepanned part of the ſcull nine months after the operation; the abſceſs was opened; a ſcale of bone exfoliated; and ſhe had a mercurial courſe adminiſtered to her for the cure of very ſuſpicious pains, accompanied with ſlight nodes on the clavicle and ſternum.

jured part, and complained of pain ; and the common applications failing to diſcuſs the tumor, they called a ſurgeon, who, ſeeing the ſcalp entire, pronounced it a bruiſe of no moment, and without the ſlighteſt attention to diet or rules, applied firſt a gum-plaſter, and then, at the end of a fortnight, punctured it with a lancet, and let out ripe pus. At this time, all the ſymptoms of injured ſcull were diſtinguiſhable, pulſating pain, ſtupor, diſturbed ſleep, and loſs of appetite, with unceaſing pain ; yet had this man the preſumption to promiſe the parents, that the boy ſhould be well in eight days. But continually a thin ichor diſtilled from the puncture, and from a ſpontaneous opening near it, without the tumor at all ſubſiding, for it continued for five months, and at laſt the part became ſo exquiſitely ſenſible, that the little patient could not endure the ſlighteſt touch of the finger. After long diſappointments, and every ſhift to ſave themſelves the indignity of applying to a diſſatisfied relation, the parents of the boy were at laſt reluctantly forced to carry him to his uncle Daniel Mann, an experienced ſurgeon of Jena. Mann and Slevogt, upon examining in concert this carious fiſtula, found two ſmall orifices, each the ſize of a pea, from which the ichor iſſued in regular pulſations, correſponding with the pulſes of the brain. The whole ſcalp was raiſed in a puffy tumor over the meeting of the ſagittal and lambdoidal ſutures ; and when preſſed, ſo as to ſqueeze out the humour from theſe openings, the boy's cries were ſo piercing, that there was every reaſon to believe that the cranium was corrupted, and that it was neceſſary to open the ſcalp. Upon cutting off the hair, paſſing a probe, and making a crucial inciſion, a profuſion of black blood flowed out. On the day of the third dreſſing, a large portion of the outer table of the cranium was found looſe in the bottom of the wound, as thin as a ſheet of paper, and perforated like a ſieve; and under this was ſeen the diploe naked, and the inner table perforated with one ſmall hole, through which a thin yellow ichor iſſued, bubbling up at each pulſation of the dura mater, (ex quo tenuis flaveſcens liquor, juxta rythmum vaſorum duræ matris pulſantium, expellebatur). Could there be a ſurer mark of things being wrong within the cranium? There ſeemed to be in this caſe the moſt flattering proſpect of ſafety from the uſual and neceſſary operations, ſince the ulcer was not ill conditioned, nor the caries incurable, ſince the functions of the brain were in no degree affected, and gradually the ſleep, appetite, and ſpirits, were reſtored ; ſince he now moved his jaws eaſily, and ſuffered only from a tremendous cough, which had ſhaken his delicate frame for three weeks.

" But from the waywardneſs of the boy, united with his recollection of the firſt

inciſions, they found him quite ungovernable. He ſtruggled furiouſly at the ſlighteſt touch, and reſiſted even the ordinary dreſſings, and thus diſappointed them of all hopes. No flattery nor threats could p evail with the child to ſubmit to what was ſo neceſſary for his ſafety, and unfortunately the fooliſh tenderneſs of the parents now interpoſed, and prevented even the appearance of an inſtrument, ſaying, "they would rather have the boy dead than tormented."

"After a fatal delay, much of the corrupted cranium was at laſt entirely diſengaged, and through two large openings the dura mater was expoſed naked, exhibiting at once three diſtinct movements from pulſation of the arteries, from regular reſpiration, and from the convulſive cough. But a new abſceſs formed towards the occiput; the uſe and benefit of inſtruments was again refuſed; the choice, indeed, was given the ſurgeons, of laying, if they pleaſed, a cauſtic on the part. But the boy became drowſy, the pulſe roſe, the appetite diminiſhed, the ſtrength gradually failed; he was ſeized with tremblings; he ſlept continually; the fever increaſed; when ſpoken to, he either did not reply, or anſwered wildly; and, after lying five days in this condition, he expired.

"The cranium was found perforated by four openings, and its inner table was eaten away by ulceration to a great extent, the dura mater coated with pus, and ſwarming with little worms, while its arteries were, (eſpecially where they approached the ulcerated parts), conſpicuouſly turgid with blood; the brain, white in all the reſt of its ſubſtance, was here of a roſy colour, with innumerable red points on its ſurface, and the ventricles full of a yellow ſerum, which flowed out the moment the cavity was approached with the ſcalpel."

Thus inſtructed in your duties by direct examples, by experience and reaſon, you are qualified to judge of authorities, and profit by criticiſm, and are every way prepared for examining the practice and opinions of celebrated men, and to take an intereſt in the general reaſonings and dogmas of your profeſſion, as you are deſtined ſoon to take your part in particular caſes. The age of Morgagni was too remarkable in the annals of our ſcience, and his epiſtles too full of real knowledge, not to deſerve every attention; it is therefore my deſign to contraſt his practice, and that of contemporary authors, with the celebrated ſurgeons of modern times, and, I truſt, you are ſo far initiated into the beſt and ſoundeſt principles of your profeſſion, as to decide, the moment the caſes are laid before you, what ſhould have been done for the hundreds of patients whom Morgagni and Valſalva ſuffered to die without help.

" A young man, (ſays Morgagni), of ſixteen years of age, was ſtruck, with a ſtone which was thrown, in the left part of the ſinciput, near to the lambdoidal ſuture, at the diſtance of about two inches from the ſagittal. No ſymptom that was worthy of remark was the conſequence, except the lips of the wound beginning to ſwell, and that ſome days only before the eleventh day; on which day a fever diſcovered itſelf, with a coldneſs and a vomiting, but without any pain of the head. After this followed convulſive motions, ſpeechleſſneſs, deafneſs, and blindneſs; and, finally, in the beginning of the fourteenth day, death itſelf.

" The cranium was unhurt, and yet the dura mater, in that part which lay under the wound, for almoſt as large a ſpace as the wound was continued, was found to be thickened, and very lax, of an unequal ſurface, and of a colour verging to a yellowiſh hue; and betwixt this membrane and the pia mater, *a concocted pus was found to ſtagnate betwixt the falciform proceſs and the upper part of the cerebrum, which lay near thereto, quite to the anterior parts.* In the whole of the cerebrum itſelf, however, was found no injury which fell under the notice of the ſenſes."

" A woman, who had been for a long time ſubject to an epileptic diſorder, received a blow upon her head. In the beginning there was no ſymptom worth attention; ſo that, if ſhe were aſked about her complaints, ſhe anſwered that they were all very ſlight, or none at all. But at the end of ſome days, the ſymptoms began to ſhew themſelves, and to increaſe; the fever was augmented, and a certain ſtate of inactivity, which was very much like a conſtant ſleep, came on, though without ſleep; for if you attended to it, you heard her murmuring with a low and ſmall voice. And in this manner, neither the firſt remedies, nor the latter, being of any advantage, ſhe died.

" The ſcull not only ſhewed no fiſſure, but had ſcarcely any change of colour, in the part where the blow had been received: *Only under that place was a purulent mucus, as we have ſaid in the old man, though in a rather larger quantity.*"

" A man, who was near ſixty years of age, received a blow with a ſtick, a little above the extreme part of the forehead, and the left temple; *no morbid ſymptom appearing then, or on the following days*, ſo that he came by himſelf every day to the hoſpital of St Mary de Morte, at Bologna; where the uſual remedies were applied to his wound, which was ſuppoſed to be no more than cutaneous, and of no importance.

" And, indeed, *during four or five of theſe days, he continued in the market, ſelling cheſnuts, according to his uſual cuſtom*, in a very cold ſeaſon. But about

the ſixth day, his wound became worſe, and a fever, attended with a coldneſs and rigor, came on; *and this returning every day in the ſame manner, without any other ſymptom being added, than a ſlight gangrene of the wounded part, the man was gradually carried off thereby.*

" The carcaſe was contracted, as it ſeemed, from the coldneſs of the ſeaſon. A little ſanies had deſcended from the wound, betwixt the extreme margin of the temporal muſcle and the bone: and the gangrene, by its eroſion, had dilated the wound to the ſize of that piece of money which is called a Roman crown: and there the naked bone came into ſight.

" On cutting out the upper part of the cranium, *no ſign of injury could be obſerved in that bone*, even upon the moſt ſtrict examination. *Yet the meninges were found to be ſanious, and ſomewhat thickened, in the whole of that ſpace wherein the bone had been laid bare.* The cerebrum which lay beneath theſe thickened parts of the meninges, had contracted a very evident, though a very ſlight injury; for externally the ſubſtance thereof was corrupted to the ſize of a ſmall vetch; and *in the middle it ſeemed to be perforated with a very ſmall foramen.* But this foramen, together with the corruption, did not deſcend lower than to a very ſmall depth."

" A virgin, of five and twenty years of age, having fallen upon the ground, was wounded with a very ſharp ſtone in the left part of her forehead. Being received into the hoſpital, ſhe was troubled with a continual fever, which increaſed every day. The wound began to be ſeized with a gangrene, which, in that ſeaſon, (for it was the month of June 1689), came upon all wounds. Some time after, the patient became idiotic, as it were; ſhe heard but little; ſhe ſpoke not at all; ſhe fixed her eyes ſtedfaſtly on thoſe about her. *At length a tremor of the whole body came on, during which ſhe died; and this was about the beginning of the 28th day.*

" The bone that lay beneath the wound was hollowed out with a ſmall dent, and a foramen, as it were, externally; about which were ſeen three chinks. But neither theſe chinks, nor the foramen, reached to the internal parts. *Yet the meninges, in that part which anſwered to the wound, were both of them eroded;* and from hence a ſerous colluvies was diſcharged, which, being diffuſed through the whole ſubſtance of the brain, had infected it with a diſagreeable odour, and tinged it of a blackiſh colour.

" A young man, of eighteen years of age, ſlender, and of a blackiſh colour, having received a blow by a ſtone that was thrown againſt one of the oſſa ſincipitis, where the temporal muſcle ariſes from it, paſſed two days without any ſymptom

worthy of remark, if you except a fever. But on the ſixth day after that, as he lay in the hoſpital of St Mary de Vita, the wound became livid, and the diſcharge which came from it was exceedingly fætid; beſides which, he had an acute fever. To theſe ſymptoms were added, near the eighth day, a ſoporific diſorder; ſo that, when ſpoken to, he made no anſwer. Sometimes he ſent forth *a kind of ſuſpirious voice*. His whole face became tumid and yellow. With all theſe ſymptoms he went on to the eleventh day; on which, *with a very great expiration, he died.*

"The whole body ſeemed to be that of an icteric perſon. From the wound a purulent matter had made itſelf many paſſages betwixt the cranium and the cutis, which it had alſo eroded. And the bone had contracted ſome roughneſs on the ſurface, from the ſtroke of the ſtone; but ſhewed no injury on the internal ſurface, which fell under the notice of the ſenſes. However, betwixt the bone and the dura mater, *in the interſtices of the veſſels of this membrane, was obſerved a cineritious matter, not much unlike a condenſed pus, in that part only which lay under the blow*; and in the ſame part only, *the cerebrum had contracted a livid colour, to the depth of two inches* *."

But I will ſpare you the quotation of narratives, deſtitute of variety, and diſguiſed in language which, only in ſome reſpects, reſembles Engliſh. This caſe is followed by that of a young man, who became delirious on the 15th day of a contuſion, and died more quietly than by a "*great expiration, with a ſuſpirious voice*," for he "ceaſed to live any more." This is perfectly intelligible and plain; the numbers who thus ceaſed to live, is ſuch as to "ſwell this epiſtle (as Morgagni himſelf acknowledges) to the bulk of a volume." To writers celebrated as Valſalva and Morgagni we reſort, with a natural confidence of finding ſenſe and reaſon combined with intereſting facts; but of all melancholy ſcenes, that of their ignorant practice is the moſt afflicting; and of all ſcholaſtic jargons, that of Morgagni, in his "EPISTLE UPON CHIRURGICAL AND UNIVERSAL DISORDERS," is the moſt contemptible. It is a ſorry ſight to ſee young and old, ſickening on the 7th, delirious on the 18th, and dying on the 20th day, unregarded; and though in each caſe there were deciſive ſigns of an abſceſs on the brain, never a thought ſeems to have been entertained of giving vent to the matter. In all theſe caſes, the proceſs of the ſuppuration ſeems regular, the ſtages marked, the ſymptoms

* *Alexander's Morgagni.*—Morgagni's volumes are ſo precious, that any kind of tranſlation was in a degree acceptable. A man has ſet himſelf the taſk of tranſlating the moſt perplexed book in our ſcience, who has not as many words as a parrot; but by repeating the expreſſions fallacious, precarious, &c. he makes it out amazingly.

invariable, the cauſe moſt unequivocal; and yet theſe great men eſcape this plain direct duty, by ſo poor an evaſion as that of ſaying, "But how ſhall we find an interval in which the ſucceſs is ſtill probable, and yet the ſymptoms urgent for applying the trepan *?" By the uniform courſe of that proceſs, which Valſalva has but too often and too truly deſcribed, the time for interpoſing is diſtinctly marked,—it is ſo far marked, that Morgagni himſelf ſeems conſcious in all theſe caſes, that the patients were ſure to die. Are we to offer no chance for life, where there is nothing but deſpair? Can the ſurgeon be ſaid to deſtroy by his operation a patient who is declared paſt all hope? Can a patient ſuffer greater agony than convulſions, or be worſe than dead?

It muſt be advantageous to contraſt, with the rules and practices of modern ſurgeons, the conduct of ſuch phyſicians, the dogmas of another age, of another profeſſion, of men ſkilled in legends and doctrines, but little acquainted with practice. But Morgagni and Valſalva are not alone to blame; theſe were the prejudices of the age in which they lived. Phyſicians, unwilling that the operation of trepan ſhould be at all reſorted to, imagined various ways by which a man might ſpontaneouſly recover from ſuppuration of the brain, by tranſpiration of the matter through the inviſible pores of the bone itſelf,—by its abſorption and diſcharge through ſome common emunctory,—by its tranſlation to ſome diſtant part.

If matter was formed upon the brain, they imagined no poſſible way by which it could be depoſited there, except by dropping through ſome crack in the bone; if none was found, or a very little, they conjectured that it muſt have been abſorbed, and conveyed away; and very greatly were they aſtoniſhed, "when, (as in a caſe by Morgagni, p. 128.), having diligently inquired after the paſſages by which pus could enter the cranium by the wound, they found all the bones that compoſed the cavity quite free from injury on their internal ſurfaces."

If, in one who died of injury of the head, it happened by any chance, that there was at the ſame time an abſceſs, however ſmall, in the liver, or lungs, it was re-

* "Thus you very plainly perceive, that caſes may happen, wherein either no ſymptoms of blood, being extravaſated in the cranium, offer themſelves in the beginning, or they are very ſlight; but after a long interval, ſo many and ſo violent ſymptoms crowd upon and attack the patient, that neither in the firſt part of the diſeaſe, which is convenient for trepanning, the patient can be ſtruck with ſuch a fear, as to make him admit of that operation, nor in the latter part can the phyſician hope to be of any uſe to the patient thereby; as you cannot ſuppoſe, after ſo long a ſpace of time, and after the exiſtence of ſo many deſtructive ſymptoms, that a corruption of the parts was not brought on, though it was abſent, almoſt beyond belief, in that very rare obſervation of Scultetus."

garded as a conſequence of the tranſlation of the matter from the injured part, for what wiſe purpoſe of nature, no one could tell. Nay, ſo crude and unphiloſophical were the notions of theſe dogmatiſts, that they actually believed that there was ſome ſort of paſſage, by which the matter moved along from part to part, and could be traced in its travel from the head, through the neck, to the abdomen; "for often I have obſerved, (ſays Marchetti), that when in wounds of the head, the neck, eſpecially towards its ſides and poſterior parts, begins to ſwell, the matter is falling down towards the thorax, which in no great ſpace of time ſo erodes both lungs and pleura, as to make its way to the abdomen, affecting in like manner the liver and ſpleen *."

Matter, if not found under the cranium, whether found in the liver or not, they believed muſt have ſomehow been conveyed away; and that, had the ſurgeon been but a little more ſudden in his motions, he might have found, at an early ſtage, under the ſcull †, that matter which was then perhaps travelling through all the veins of the

* "Obſervavi ſæpiſſime, quod quando in his vulneribus collum incipit dolere, parte potiſſimum poſtica, et laterali, tunc materia purulenta delabitur ad thoracis, et abdominis cavitatem, quæ longiori mora cum pulmones, tum pleuram, aliquas nempe ipſorum partes erodit, ex quibus multa ſanies emanat, quæ poſtmodum ad abdomen defluit, cum jecoris et lienis labe, in quibus varias puſtulas excitat, quibus diſruptis, perinde ac ex pulmonibus, et pleura, ita et ex his materia purulenta effluit; quanquam hujus obſervationis ignari, exiſtiment, abſceſſus obortos in his partibus, quorum ratione patientes moriuntur, non ex capitis vulnere, quod ex capite copioſum pus poſſe ad inferna viſcera delabi non ſibi perſuadeant: prout in pleriſque obſervavi, mediam thoracis, et abdominis cavitatem pure fuiſſe refertam."

† "If you compare this hiſtory with thoſe animadverſions which I made above, you will readily ſuſpect the cauſe from whence a pleuriſy had ariſen in this young man; and *that the very ſmall quantity of matter which was found under the dura mater, was the remains of ſome which had exiſted there in much larger quantity*, the other part of it having been tranſlated into the thorax in particular, and into the whole body in general; as the univerſal ſtate of putrefaction ſhowed. *And, if this was the juſt idea of the caſe*, it were to be wiſhed, that before the matter could have been carried to theſe parts, *it might have been extracted by a perforation of the cranium*."—Many have ſagaciouſly pointed out the ſymptoms and ſigns by which it may be known when and how the matter is dropping down to the liver. "Joh. Virſangius ait ſe ex apertione multorum cadaverum didiciſſe ejuſmodi abſceſſus poſt funeſta, imprimis muſculi temporalis vulnera! proveniſſe." And Marchetti ſays, "Quando in his vulneribus *collum incipit dolere, parte potiſſimum poſtica, et laterali* materiam purulentam *delabi* ad thoracis et abdominis cavitatem, ſæpius ſe obſervaſſe."

And Slegelius found out a moſt ſubtile cauſe for that peculiar appearance of a wound, which indicates danger, or approaching death. "Animadvertit omnes quibus capitis vulnus lethale fuiſſet, ante obitum conqueſtos fuiſſe, de hepatis vel lienis dolore, dicitque ſe in ipſorum cadaveribus abſceſſum ſemper reperieſſe hepatis, quem ex metaſtaſi puris ortum fuiſſe putat, *qui vulnus eo tempore fuerat valde aridum et ſiccum*."—In ſhort, *that the wound of the ſcalp is pale, ſhrunk, and arid, becauſe the matter has been transferred from it to the liver.*

body, ſeeking its way through all the paſſages, and ſticking in all the pores. Theſe are ſevere accuſations againſt the greateſt men of that age, but unhappily they are but too well ſupported *. " A robuſt country lad, (ſays Morgagni), having fallen from a high place, had hurt his head. He lived as uſual for three days, and followed his profeſſion ; but a tumor ſoon appeared, a fever enſued ; he was thus driven to take ſhelter in the hoſpital. When every remedy was applied by the phyſicians, he ſeemed to recover ; but, about the 17th day, being able to bear hunger no longer, he was ſo preſumptuous as to eat ; the fever, headach, and vomiting, returned. He was trepanned, but the dura mater was ſound. He was ſuddenly ſeized with a pleuriſy, and died. The carcaſe was livid below the throat, and throughout extremely putrid." " If you compare (ſays Morgagni) this hiſtory with the animadverſions I have formerly made, you will readily ſuſpect the cauſe from which a pleuriſy had ariſen in this young man, and *that the very ſmall quantity of matter found under the dura mater, was the remains of ſome which had exiſted there in much larger quantity, the other part of it having been tranſlated into the thorax in particular, and into the whole body in general* †." And why into the whole body in general ? and why into the blood and lymphatic glands ? That the fever might be accounted for ; and that when ſuch matter was neither found within the cranium, nor in the lungs, nor in the liver, nor in the reins, it might be ſuppoſed courſing round the body. But how comes it to paſs, that abſceſs of the liver and lungs, do really accompany wounds of the head ? This word *accompany*, is itſelf an explanation, for I cannot think it at all more extraordinary, that abſceſs of the liver ſhould accompany abſceſs of the dura mater, than that wounds of the head ſhould be accompanied with bruiſes of the body. If you open many bodies, dying of fractures of the ſcull, you will find, if life has been long protracted, ſuppuration of the liver, or lungs : if the death be ſudden, you will find only effuſions of blood in the thorax, or abdomen ‡. This robuſt young

* That the pus carried from the other parts into the viſcera, is not always depoſited in the proper form of pus, but frequently, at leaſt that many of its particles being mixed with the blood, and intirely disjoined from each other, ſtick in ſome narrow paſſages, perhaps, of the lymphatic glands, and by obſtructing and irritating them, as happens in the production of buboes, and by relaxing the humor, diſtends them, and produces tubercles, &c. Such are the ingenious theories of Molnelli, as quoted by Morgagni with a great reverence and approbation, p. 103.

† Page 138.

‡ In the caſe of Sharp, the dancing-maſter, related p. 358. there had been, from the violence of the fall, a

man fell from a great height; and when a man falls from ſuch a height, as to have the ſcull hurt, the ribs fractured, and even the vertebræ broken, it is not to be wondered at if the lungs and pleura ſuffer, or if the weight and looſeneſs of the liver cauſe ſtill more frequently an effuſion of blood in that viſcus. Perhaps, when a man having fallen into a quarrel, has got blows about the head, has at the ſame time an inflammation in the liver or lungs, the phyſician would ſhow his wiſdom more rich in inquiring, whether he got, along with his broken head, what Sancho emphatically calls a "rib-roaſting," than by what ſecret paſſages matter had deſcended through the neck into the lungs *.

Occupied with ſuch idle ſpeculations, Morgagni, Valſalva, Marchetti, and all the Italian phyſicians, looked with perfect compoſure upon their dying patients, expected the tranſlation of matter, counted out the critical days, gravely foretold death, and yet refuſed the aſſiſtance of the trepan. It was not poſſible that they ſhould long believe in this metaſtaſis, or tranſlation of matter, without thinking of means for promoting ſuch abſorption, by pigments and potions. What theſe pigments and potions are, you may learn from Fallopius, Muſitani, or any author of that age, but eſpecially from the *liber aureus* of Berengarius, the beſt and ſobereſt of thoſe who believed in the doctrine of tranſlation. The compounds which diſcuſs effuſed blood, or tranſlate pus, are innumerable; and thoſe which were ſuppoſed to have the happieſt effects, do not ſeem to have had the moſt diſtinguiſhed origins. "One Berengarius learnt indirectly from certain Spaniſh ſailors, and found it equally uſeful in all conſtitutions, periods, and circumſtances †; it is a tincture of myrrh, aloes, and ſaffron in ſtrong ſpirits. Another he learnt from a Jew quack doctor. "Quidam Hebræus, ſatis mihi amicus, et inter empyricos fide dignus;" a tincture in which wine, madder, muſtard, dittany, betonica, parcely,

great effuſion of blood into the lungs. In the caſes related by Morgagni, p. 103-4. blood was effuſed in almoſt all parts of the body; the liver black with extravaſated blood, and the fractured ribs viſibly protruding through pleura.

* Morgagni, let. 5. art. 4. aſcribes a ſuppurated ſtate of the brain, to the cancerous habit of the woman, who had her leg amputated; *and to the transferring of the pus from the ſtump to the ſurfaces of the ventricles of the brain.*

† "Repertus eſt etiam, quidam alius modus, primo a certis Hiſpanis nautis, (ut retulit mihi fide dignus quidam); deinde a certis Januenſibus in Italia, quem poſt multi ſunt ſeculi, et eſt cum aquis et pulveribus infra deſcribendis. *Illis indifferenter in omni ætate, læſione, complexione, et tempore, et ut breviter,*" &c.

cloves, mallows, gentian, maidenhair, agrimony, century, and indeed a whole materia medica of herbs and roots." But it is a medicine too good, I find, to be efficaciouſly adminiſtered by practitioners of modern times: For, "when thou giveſt each cup, thou muſt make the ſign of the croſs, ſaying, In the name of God the Father, God the Son, and God the Holy Ghoſt, and of the whole Trinity, I give thee this;"—the patient ſaying, "Thou, O Lord, giveſt the virtue; thy right hand ſhall deliver me; I ſhall not die, but live to praiſe thy works *." "If the ſick perſon (ſays Berengarius) retain his draught, and do not vomit, he ſhall receive no benefit therefrom; if he vomit, his head ſhall be relieved." The relief which vomiting might bring, I believe, he could not be long without; for the balſam of Firebras, adminiſtered by Don Quixote to his truſty ſquire, ſeems to me honey and balm to the inward parts, compared with the inteſtine commotions that this tincture muſt have produced. The motive which Berengarius acknowledges, (and I confeſs it is in ſome degree my own), for giving theſe precious pigments a place, is, "Ut hoc noſtrum opus magis ſit pingue et delectabile;" though the epithets, *pingue et delectabile*, were more appropriate to the complexion of a merry ſong, than a ſurgical book.

You will not eaſily believe what ſerious and important reaſons I have to aſſign for taking notice of theſe things. Though puerilities ſuch as theſe are in no danger of being repeated; yet, in paſt times, they have had the moſt unhappy effects in practice; a confidence in theſe wretched faragoes ſupplied, in the opinion of the great Morgagni, of Muſitani, of Magatus, of Vidius, of all the doctors of this party, the place of the operation of trepan. "All the patients I have referred to, (ſays Morgagni), were perfectly cured *without the aſſiſtance of the trepan*, and that very ſoon. A lady, whoſe horſes had taken fright, threw herſelf from the chariot, fell among ſtones and hard ice, and lay for dead. The other phyſicians being alarmed, I was called, and urged many reaſons why we ſhould apply the fomentation which Ruyſch had frequently made uſe of, and with great ſucceſs, and not contrary to the cautious admonitions of Magatus, but having in it ſome of the ingredients that he had recommended. The phyſicians came into my opinion; nor had they reaſon to repent it, as by continued uſe of this remedy the patient firſt became a little better, and

* Pro quolibet cyatho, et crucis ſigno facto, in nomine P. et F. et Sp. et individuæ Trinitatis, dicatur: dextera Domini exaltavit me; non moriar ſed vivam, et narrabo opera Domini."—*Berengarius*, p. 130.

then came quite to herſelf, and died long after of old age." "But before I ceaſe to ſpeak of this fomentation, I would have you to obſerve, that *almost all thoſe perſons* that I ſaid had been ſaved without the trepan, *which otherwiſe ſeemed neceſſary*, and others of the ſame kind, have *been ſaved by means of this fomentation*, or at leaſt by ſomething very ſimilar to it *."

"Saved by Figs-ends!" To be ſaved, implies the active interference of the phyſician, or ſurgeon; to be ſaved from abſceſs of the brain, from ſickneſs, from palſy, and delirium, already begun, (the caſes which he here inſinuates were ſo cured), requires ſomething very different from fomentations, from infuſions of marygolds, or decoctions of Fennel and Rue. If a few recovered, it was through the natural powers; and none, I am perſuaded, recovered without trepanning, who had effuſions either of blood or of matter upon the brain.

The purpoſe theſe authors had in their writings, was of a very different kind from what might be at firſt ſuſpected in looking into their works. The humane enterpriſe they had entered upon, was, to diſſuade and terrify ſurgeons and patients from that kind of relief which the ſkilful in all ages have appointed for ſuppuration of the brain, and utterly to abrogate the uſe of the trepan. "Exploſimus fracti cranii tum trepanationem, tum meningum et cerebri vulgarium curationem, (ſays Muſitani); nunc noſtram in vulneratorum ſolamen cito tuto, &c. in his curandis duplicis generis medicamenta ſunt neceſſaria, alia externa, alia interna;" and after this imperious language, this bold commendation of his medicamina duplicis generis, his pair of medicines, external and internal, he breaks out into a raving fit againſt trepanning, and againſt ſurgeons, ſo extravagant, that it might have entitled him to a liberal doſe of the moſt powerful of his own pigmenta: "A helliſh invention, (he calls the trepan), imagined by none but Satan himſelf, by Beelzebub, by the prince of devils, and put by his art into the accurſed hands of ſurgeons! a weapon (ſays Muſitani) with which they have filled innumerable graves, and crowded the banks of the infernal river with ghoſts †."

* P. 145.

† Againſt the much-admired precept of Celſus, "Anceps preſtat quam plane nullum experire remedium," excellent as it has been eſteemed, Muſitani proteſts in ſtrong terms, "quaſi humano generi perduellis, et funeſta." He ſays the moſt daring things of the much-admired Celſus: "Fuit Celſus rudium vulgarium patronus, et humanæ cladis auctor;" and of the perforation of the ſcull he ſpeaks in terms of deteſtation: "Hæc maledicta cranii perforatio vulneratorum myriades tentatæ immolavit, non exiguos implevit ſarcophagos et innumeros defunctos animos ad Charontis cymbam adegit, quum a Beelzebub dæmonorum principe, et humani generis hoſte, nactam fuiſſe, et nefariis conſignatam chirurgis credimus." This exploſion of ex-

So prevailing was the influence of thoſe phyſicians, that in all the cities of Italy, no one would, even in the moſt deſperate circumſtances, ſuffer his friend to be trepanned: The operation ſupplanted by theſe precious medicines fell quite into diſuſe *; hence the innumerable deaths, recorded not only by Valſalva and Morgagni, but by Bonetus, and by Horſtius alſo, and indeed by every collector of facts. You no ſooner open the volume of Horſtius, than you plunge into the ſame miſerable detail that you read in every page of Morgagni; numbers dying unaſſiſted of contuſio cranii. His very firſt caſe is that of a young man, who being, in a quarrel betwixt the townſmen and ſtudents, wounded on the head, was permitted to linger a whole month unaſſiſted, though plainly dying; and when he died, the ſcull was ſo completely carious, that a large piece of it dropt away.

Theſe phyſicians denied the uſefulneſs of the trepan, and doubted the exiſtence of ſuppuration; for Hornungus, in a letter to Horſtius, after many compliments on the manner in which a certain caſe is drawn out, ſays, "Dubitet jam de cerebri apoſthematibus qui volet; ego ruſtici iſthius Gottingenſis (phalange vulnerati) exemplo confirmatus, amplius dubitare nolo." Yet they did not truſt ſo entirely to the cure by vulnerary tinctures, as to their calumnies againſt the operation. They taſked their ingenuity, in inventing objections againſt the operation of trepan; there was no kind of reaſoning they did not condeſcend to uſe. Morgagni dedicates many a wearifome and inſipid page to this drudgery, falls a-conjecturing about an art he plainly did not know, and expatiates upon the "many, and various, and difficult cauſes, for which the perforation of the cranium, though ſkilfully and innocently performed, may neverthe-

travagance is in the peculiar ſtyle of Muſitani, who continually raves about cheats and impoſtors, ſurgeons, old women, and quacks, and hangmen, and ſarcophagi, and Charon, and Beelzebub, and all the infernal divinities, Chriſtian and Ethnic.

* There is no occaſion, therefore, to wonder that the people of this country began to refuſe the aſſiſtance of this remedy, being deterred from it by experiments of its being uſeleſs in particular, or injurious; and this not only in *one or two cities, but in moſt of the cities of Italy*; and, beſides our countrymen, by others alſo, amongſt whom Wepfer hints that his countrymen were, at a time when the uſe of the trepan even flouriſhed among us: his words are, "The Italians, and other inhabitants of the more warm regions, would have determined to make uſe of the trepan immediately; and the very experienced D. D. Burgouverus would have done the ſame thing, if the patient, and thoſe who were about him, had not entertained a dreadful idea of a remedy which they were unuſed to in theſe places, and which is terrible to moſt perſons, even by its name alone, and had not, in conſequence thereof, reſiſted his endeavours."—*Morgagni, as traduced by Alexander*, p. 140.

leſs become uſeleſs." He "*ſuppoſed*, that the blood might be extravaſated, not under the cranium, but in the ventricles, or upon the baſis of the brain*;" or that it might be extravaſated under the cranium, but at a point where the ſurgeon would not dare to perforate, under the temporal muſcle perhaps, or beneath the frontal ſinus†." Morgagni had all the learning and all the prejudices of the phyſician; he is very liberal of quotations and authorities, againſt cutting the muſcle, or trepanning the ſinus, and talks as if the queſtion of perforating or not perforating the ſcull, were one of mere expediency, and not of life or death: as if the occaſional thickneſs and thinneſſes of the cranium ‡ were motives for refuſing help.

He *ſuppoſed*, too, that the blood, though actually extravaſated betwixt the dura mater and the cranium, though in places eaſily acceſſible, might be ſo congealed, as to defy the inſtruments of the ſurgeon: was not this an admirable ſuppoſition? "where nothing forbids perforation, (ſays Morgagni), yet if, being coagulated, it adhered ſo cloſely and tenaciouſly to that membrane, as not to *be ſeparated therefrom without violence*, as it has happened to many others, and to Valſalva himſelf, more than once to find it: it is of courſe needleſs to apply the trepan" That ſuch puerile conjectures ſhould be made by men celebrated like Morgagni and Valſalva,—that they ſhould imagine a ſurgeon to be rationally employed when contriving menſtrua for diſſolving blood thus congealed, and

* "Take care how you ſuppoſe, that I here wiſh for greater diligence, or ſkill, in theſe very celebrated men. There are cauſes enough for us to accuſe, as I had begun to ſay. Thus ſuppoſe, for inſtance, that blood is ſometimes extravaſated within the ventricles of the brain, or under the baſis of it."

† "At other times it may be extravaſated externally indeed, and at the upper part, but under the dura mater; or if above this, yet in a place directly oppoſite to which the ſurgeon dare not trepan; for inſtance, under the muſcles of the temples, or oppoſite to the pituitary ſinuſſes of the forehead."

‡ "Suppoſe, a ſurgeon, who happened to be ignorant how often dents or cavities are impreſſed upon the internal ſurface of the cranium, which cavities I have already ſpoken of to you, and which ſometimes receive ſo very deeply the tubercles, as they formerly called them, of the dura mater, that you will have only one, and that a very thin external lamina of the bone, remaining, eſpecially in the oſſa ſincipitis, and ſometimes in the os frontis; through the ignorance of which circumſtances, I fear, leſt ſome obſervers have conſidered them as diſorders of the cranium, and dura mater; if he then, I ſay, had by chance borne down the trepan againſt any one of theſe cavities, for they have no certain ſituations, he would, without doubt, firſt have injured the dura mater, and the parts whereby it is raiſed up, before he could have ſuppoſed the whole of the firſt lamina to have been pierced through by him: or, if another, having laid bare the ſame membrane by the trepan, and ſuppoſing pus to be confined under it, (for there ſometimes is pus), as we learn from many obſervations," &c.

pouring ſuch diſſolving menſtrua into the trepan-hole, or dropping into it (as Marchetti directs) pigeon's blood, proves only how little they were entitled to prejudge ſuch a queſtion, and how much, in matters of ſurgery, actual practice is indiſpenſable to a right knowledge of facts *.

It was alſo *ſuppoſed*, that blood might be extravaſated in diſtinct places, ſo divided from each other by adheſions of the dura mater, as to prevent all communication, that neither the blood could be fully evacuated, nor the reſolving fluids be rightly injected. "And you may, moreover, (ſays Morgagni), *ſuppoſe*, if you will, all that I have ſaid concerning blood, to be ſaid alſo of pus;" viz. that it may be *too thick*; that it may adhere, by *its own tenacity*, to the dura mater, or be detained by the adheſion of the dura mater to the ſcull.

"*Suppoſe*, ſays Morgagni †, (for it is a ſuppoſition from firſt to laſt), ſuppoſe the veſſels ruptured, of what effect would it be to perforate the cranium, in order to draw out extravaſated blood, if *ſtill freſh and freſh extravaſations were made*,

* "To take notice of ſome of theſe only; at leaſt, though the blood was extravaſated betwixt the dura mater and the cranium, and in thoſe places even which nothing forbids us to perforate; yet if, being coagulated, it had adhered ſo cloſely and tenaciouſly to that membrane, as not to be ſeparated therefrom without violence, as it has happened to many others, and to Valſalva himſelf, more than once, to find it; for we particularly refer to nothing, as you may even have obſerved above, but you have examples of almoſt every circumſtance in the preceding or in the preſent letter; of what advantage would it have been to perforate the cranium?

"You will perhaps ſay, But if it had adhered in this manner, even before death, a ſkilful ſurgeon would have been able to apply ſuch things as might diſſolve, and ſet it looſe. Let us ſuppoſe it. Yet, what if ſome part of the coagulated blood lay in ſuch a place as the infuſed fluid could have no acceſs to; for you are not ignorant that this membrance adheres very cloſely to the cranium; and that it follows from hence, that one place, wherein it is ſeparated from the cranium, cannot communicate with another, though very near, in which it is likewiſe ſeparated, or at leaſt ſo expeditiouſly, as would be neceſſary for it both to enter and to be diſcharged.

"Nor am I ignorant by what inſtruments ſurgeons can ſeparate ſome neighbouring part of the dura mater from the ſcull; and that the patient, by holding his breath at intervals, may urge the cohering matter, and procure it a more eaſy diſcharge from its receſſes."

† "Suppoſe that the arteries either were not in the number of the largeſt, or were not altogether ruptured; for in this caſe there would not be time to apply the trepan. Yet of what effect would it be to perforate the cranium, in order to draw out the extravaſated blood, if ſtill freſh and freſh extravaſations were made, and added to the firſt, by the arteries, though of the ſmaller ſize, which were not altogether ruptured? I omit other cauſes, even thoſe which are not to be imputed ſo much to the careleſſneſs and errors of the ſurgeons, as of the patients and thoſe who are about them, which are not always known to the common people; and I go on to that from which I ſuppoſe it has more frequently happened, than from others, that the perforation of the cranium might, to the populace, ſeem of no effect."

and added to the firſt, by the arteries of a ſmaller ſize, which were not altogether ruptured?" though the truth is, that ſucceſſive extravaſations were never known to have happened. "*Suppoſe* (ſays Morgagni) there are ſigns from which we *ſuſpect* that blood is extravaſated within the ſcull; who can for a certainty ſay, whether there is really ſuch extravaſation?" No man; no man can at once ſuſpect and know; no man can be at once doubtful and certain; but if, indeed, a ſurgeon may not operate when directed by ſigns and ſymptoms, by rational and probable concluſions; if he is to apply the trepan only when he can ſee or feel the extravaſated blood or pus, there is an end to all operations, all conſultations, all reaſoning upon that ſubject, which I have always eſteemed the moſt important in ſurgery. We ſee by what unfortunate prejudices Morgagni's own mind was influenced, by what ſhallow reaſonings he ſought to infuſe the ſame doubts into the minds of others. He has ſaid, that the ſymptoms are always either too ſlight, or too violent; that it is always too early, or too late, to reſolve upon ſo alarming an operation. There never is a time perfectly ſuitable for doing that which one diſlikes; Valſalva and Morgagni deliberately reſolved never to allow their patients the chance or benefit of ſurgical advice, or ſurgical aid. They diſcouraged all inquiries into the condition of the ſuppurating brain,—condemned the operation which might have given relief,—contented themſelves by ſhowing their ſkill in prognoſticating death; all their patients were carried unaſſiſted to their quiet graves; and each diſſection proves, THAT LESS DELIBERATION AND MORE ENERGY MIGHT HAVE SAVED THOSE WHOM NO RASHNESS COULD HARM.

You will not, Gentlemen, be ſurpriſed, when I contraſt with the ſpeculations, theories, and conjectures of phyſicians, on queſtions purely ſurgical, the opinions and practice of our celebrated ſurgeon Pott, whoſe opinions and writings are ſo juſtly eſteemed, who ſaved, by his dextrous operations, hundreds of thoſe who muſt have periſhed under the guidance of Valſalva or Morgagni. He was engaged in that tumult of practice, which left him little time to frame general laws; yet he could not fail to act with good ſenſe and ſkill in each individual caſe: He was ſure to practiſe right, but in danger of teaching wrong, or at leaſt imperfectly: His opinions want but one ſhort explanation, for they are ſuch as will never be diſputed, where they are underſtood.

"For my own part, (ſays Pott *), I have no doubt, that, although by eſtabliſhing it as a general rule to perforate in all caſes, ſome few would now and then be

* Page 148.

ſubjected to the operation, who might have done very well without it; yet, by the ſame practice, many a valuable life would be preſerved, which muſt be inevitably loſt without it, there being no degree of compariſon between the good to be derived from it, when uſed *early as a preventative*; and what may be expected, if it be deferred till an inflammation of the dura mater, and a ſymptomatic fever, make it neceſſary?"

A preventative! How could the operation of trepan prevent inflammation of the dura mater? could perforating the ſcull with a ſaw, tearing up the veſſels which naturally connect it with the dura mater, and expoſing that membrane to rude dreſſings, and the touch of inſtruments, prevent inflammation? Yes, ſurely: it could prevent all the dangerous conſequences of inflammation: it could prevent matter accumulating, and inflammation ſpreading: it could prevent ulceration penetrating to the brain: it could convert an extending and moſt dangerous abſceſs into an open ſore: it could enable the dura mater to granulate and unite with the integuments. There is no good purpoſe that a timely operation might not ſerve; and if the trepan be uſed only when it ſhould, there can be no veſſels torn; nor will the the dura mater be expoſed, for the dura mater is previouſly in a ſtate of ſuppuration, and ſeparated from the inner ſurface of the ſcull. We find, by his examples, that Pott meant by prevention, the anticipation of worſe ſymptoms, the preventing of death; that he regarded the operation as preventative, when it was uſed ſo early, that though the dura mater had previouſly ſuppurated, the ſuppuration was but ſlight; when by the timely opening of ſuch abſceſs, it was prevented reaching the brain, when the dura mater granulated eaſily, and healed naturally. Unleſs we were to take an ungenerous advantage of a ſlight inaccuracy of language, and diſpute the words of this author, while we underſtand his ſenſe, we muſt acquieſce in the principles he has laid down, and give him honour and praiſe, for the comprehenſive and judicious views he has taken of what he ſaw going on around him, for the honeſt and manly boldneſs with which he has declared his principles, ſo different from thoſe tranſmitted to us by the writers of the preceding age, and for the generous manner in which he has taken upon himſelf a reſponſibility of the moſt critical nature, reſiſting alone all that torrent of reproach which was likely for a time, and eſpecially in his own day, to be attached to what may be termed Hoſpital Practice, harſh and cruel ſurgery. But ſtudy his caſes, and you will perceive, that whenever Pott trepanned, the patient was in danger, the bone bare, the tu-

mor puffy, or the wound (if there was one) fætid, the pulſe quickened, the face fluſhed, the head in confuſion, and the fatal ſhiverings begun; and theſe are marks, not of future danger, but of actual ſuppuration. It is fortunate for mankind, when new doctrines are not extravagant; when thoſe who enjoy the public favour, have won it, not by the capricious and captivating effuſions of genius, but by the laſting attraction of ſober inquiry and ſterling ſenſe; when a popular work contains principles which, being founded on experience, will ſtand the teſt of time.

DISCOURSE III.

SKETCH OF THE ANATOMY AND PATHOLOGY OF THE BRAIN.

THE title of our preſent ſubject reminds us of its extent and value: the ANATOMY AND PATHOLOGY OF THE BRAIN, implies deſcriptions more or leſs extenſive of the parts, the ſtructure, the morbid affections of an organ, which rules over all the motions, and all the ſenſations of the body. Whatever be the nature of the brain, its influence over the ſyſtem is paramount; the brain receiving a ſhock, the whole body becomes torpid; the brain being oppreſſed by congeſtion of blood, within its veſſels, the ſenſes are obſcured; the brain ſuffering compreſſion by the extravaſation of blood on one ſide, one half of the body is ſtruck with palſy; and any of thoſe compreſſions being great or long continued, there enſue vomiting, inſenſibility, coldneſs of the extremities, and total palſy, ſo that the ſphincters are relaxed, and the fæces and urine paſs involuntarily; a ſtate invariably followed by death. When the brain is ulcerated on its ſurface only, but not oppreſſed, we are warned of the danger by unuſual terrors, a nervous ſtate of the ſyſtem, diſturbed ſleep, trembling of the hands, and tottering of the knees, ſhiverings and fever, which denote the approach of death: When it is inflamed throughout its ſubſtance, its function is excited to phrenzy, delirium, or mad-

neſs: Even when it is but ſlightly oppreſſed and diſordered, fromi rregular circulation, all the body partakes of the diſorder. When the affection of the brain re-acts ſlowly on the body, when this part, whoſe influence moves every organ, and regulates every feeling of the ſyſtem, loſes its influence, the ſtomach is affected, ſickneſs and languor enſue, with debility of the limbs, waſting of the body, and diſorder of mind; and at laſt, feelings of deſpair and diſtraction take poſſeſſion of the patient, whoſe haggard countenance, and jealous eye, gloomy thoughts, and diſordered perceptions, mark the diſeaſe we call Hypochondriaſis.

The brain, intereſting as it may be to the philoſopher, is infinitely more ſo to the phyſician, not as the ſeat of intellect, but as governing all the vital, and all the voluntary motions, regulating every action, and every ſenſation, ſo that we have no health nor pleaſure, but in proportion as its functions are ſound. Both the delicacy of the brain, and its univerſal influence over mind and body, gives a complicated form to all diſeaſes ariſing either from any diſorder of its circulation, or injury of its ſtructure. Such is its extreme delicacy, that if we but ſtoop, or run, or laugh, confuſion of head, giddineſs, and faintneſs, intimate how eaſily it is affected by the ſlighteſt acceleration of circulation; when we bleed from a wounded blood-veſſel, though ſuch bleeding is attended with no real danger, and produces no permanent effects, we faint and fall down, feel cold and motionleſs, from the blood ceaſing for a moment to circulate with due energy within the brain; when, from a continued affection of the brain, the ſtomach is affected, an indeſcribable train of nervous maladies enſue. It is not, then, a ſurgical or local diſorder manifeſt to the ſenſes, that I am now to deſcribe, not the fracture or caries of a bone, important only as it belongs to a part deſtined to defend the brain, but the conſtitution and diſeaſes of the brain itſelf; the internal and natural diſorders of the moſt delicate organ of the body, whoſe function is not merely neceſſary to intellect, but to life; whoſe diſorders affect every function, vital and voluntary, the power of the muſcles, the functions of the ſtomach, the particular ſenſations of the parts, and the feelings of the mind. The views I am to lay before you of the ſtructure and diſeaſes of the brain, muſt influence your reaſoning and conduct in matters of daily practice; my inſtructions, not limited now to the trepanning of the ſcull, or the cutting away a carious bone, relate more or leſs remotely to almoſt all the diſeaſes of the living ſyſtem; and believe me when I ſay,

that in writing upon ſuch a ſubject, I touch it with reverence, I proceed with caution and reſerve, to deduce ſimple views of practice from facts and diſſection; and, ſhould I feel that I have been in any point incorrect or precipitate, I ſhall think it a proud and virtuous employment, to recede from my errors, whatever be their nature, and retract them openly and ingenuouſly.

If I may any way expect the felicity of eſcaping errors, or of perceiving and retracting them, it muſt be by abandoning theories, ſuch, at leaſt, as have hitherto obtained that name, and appealing to anatomy, to the innumerable and moſt intereſting proofs of each diſeaſe, being accompanied with a correſponding change within the brain. What but the neglect of anatomy could make the ſubject the moſt intereſting in the whole circle of medical ſcience be neglected? Yet I muſt not ſay neglected: no, much ingenuity has been waſted in developing the powers and properties of the nervous ſyſtem; there is not a ſymptom of deranged action, or irregular ſenſation, which is not exquiſitely explained; doctrines of nervous tremors, and nervous fluids, and experiments on the irritable and ſenſible fibre, have occupied the profeſſion for centuries! Without inquiring into the ſtate of the brain, (the ultimate ſeat of this ſenſibility), ſuch affections are pronounced nervous: This one word is underſtood to be a full and philoſophical explanation of the nature of all diſeaſes: it is a word which no one is aſhamed to uſe, which no one is able to define: wherever this vague word is uſed, cordials and ſtimulants follow of courſe, the moſt deſtructive preſcriptions, in any affection of the brain: Debility is ſpoken of as if it could exiſt without a phyſical cauſe, and nervous diſorders are treated of as having no eſſential nor phyſical relation to the ſtate of that organ, which is the ſource and centre of nervous energy. It is theories without knowledge, conjectures without proofs, diſeaſes without diſſections, conjectures ſubſtituted for facts; it is by the precipitate deciſion of genius, anticipating and deſpiſing all ſlow and ſerious inveſtigation, that the whole of this intereſting department ſeems like a dream, unworthy of the ſerious ſtudy of a ſober and thinking man.

How the importance of anatomy could be miſtaken, how it could be imagined that thoſe things might be conjectured which ſhould be ſeen and touched, it is not eaſy to conceive: "Without anatomy, what is medicine? its importance is indeed very ſlight." "Exilem majeſtatem obtinet medicina abſque anatomes ope." Anatomy, as uſually ſtudied, has been held in contempt by the moſt ſenſible and

learned men. "Non loquimur (ſays Muſitani) hic de anatome locali, nam ſecandorum corporum ſtudium plane puerile eſt. Difficcant vulgares cadavera, &c. Cæterum etiam loquimur *de anatomia vitali, quæ corporis morboſi accidentia meditatur*, et ſubjecti proprietatem novit, ſine cujus cognitione alias nullus eſt medicus, et ſic una eſt et vera anatomia, quæ ex dictis duabus progreditur*." "We ſpeak not of that anatomy which is converſant only with names and deſcriptions, and with the ſimple forms of parts, but of the anatomy of health and diſeaſe, of the properties of the body, and the appearance of morbid parts: without this, a phyſician is naught, and the common knowledge of anatomy without its uſe, which reſults from comparing together the properties of the healthy, and the appearances of diſeaſed parts." This alone is anatomy: this is the anatomy which belongs to the profeſſion, not to ſchools, which improves as we advance in practice, and becomes more perfect and more intereſting, in proportion as the minutiæ, by time and want of uſe, vaniſh from our recollection. This is the kind of anatomy, (viz. the inſpection of the cauſes of diſeaſe), of which I hope to make you feel all the advantages: Amuſing ſubtilties, and ingenious theories, are indeed independent on this knowledge; but there is no doctrine really uſeful, or, in other words, no general collection of facts to be attained in our ſcience, or in any other, without obſervation and labour. The facts about which you have to inquire, the philoſophy you have to attain to, conſiſt in the knowledge of thoſe peculiar ſtates of the brain, which accompany certain affections of the body; for the brain operates on all the body, and the diſorders of its circulating ſyſtem, by which theſe conditions of the organ are produced. By remarking the ſeveral ſtates of the organ, its diſorders may be defined according to their eſſential nature, and by reaſoning on the various ſtates of its circulation, and on the conſequences of its blood being accelerated or accumulated, they may, I believe, be prevented or cured.

ANATOMY OF THE BRAIN.

I AM not now to repeat what you muſt be acquainted with, the minute anatomy of the brain, the tubercles, the cavities, and the proceſſes of it; but to give you general and comprehenſive views of its ſtructure, and of the accidents to which it is

* Muſitani, page 115.

ſubject. I ſhall endeavour to give you right conceptions of the manner in which the various external and internal ſhapes and forms of the brain correſpond with each other; to explain to you the general nature of its cavities, the delicacy of its ſubſtance, the peculiarities in its circulating ſyſtem; to recapitulate that kind of anatomy which one engaged in practice would wiſh to know; to impreſs that general conception of the form and ſtructure of the organ which ought to ſurvive the minuter recollections. If you ever are to learn how to reaſon on the ſtructure, or diſtinguiſh the diſeaſes of the brain, it muſt be, not by ſchool-boy-like recollection of the names and appearances of individual and minute parts, but by forming for yourſelves manly, rational, and comprehenſive views of its general ſtructure, circulation, and functions. Nothing can be more deſirable, ſurely, than ſuch general views; nothing, I am perſuaded, more uſeful: Do not allow yourſelves to believe, that the anatomy of the brain, the forms of its cavities, prominences, or parts, will ever explain its office. The beſt uſe of anatomy is the practical ſcience of diſtinguiſhing the marks of diſeaſe; a ſcience moſt intereſting to humanity. But as for that ſpecies of philoſophy, to which men of all ages have been addicted, referring the ſeveral faculties of the mind to individual parts of the brain; imputing to the moſt trivial varieties of form, the moſt wonderful powers of the mind; it is a kind of materialiſm too groſs and contemptible to deſerve refutation, and leads to queſtions unfit for this place, ill ſuited to our faculties. But every ſtep of our inveſtigation will lead to this univerſal and important fact, with which you cannot be too early acquainted, viz. That the brain, in its own nature inſenſible, may be piece-meal deſtroyed, without the faculties being ruined; that no local injury offends; that the faculties are obſcured by ſuch cauſes only as affect the whole; that the ſlighteſt general injury produces the worſt ſymptoms, the moſt deſperate local injuries produce none.

OF THE DURA MATER.

The dura mater is like other membranes formed of condenſed cellular ſubſtance. It is the cellular ſubſtance to the inner table of the cranium, the nutritious membrane of the bone. It is as a ſecond ſcull, which, when the cranium is trepanned, or injured, continues to ſupport the brain. Its partitions, ſinking betwixt the hemiſpheres, and extended betwixt the brain and cerebellum, protect, ſupport, and ba-

lance the whole, and defend the ſeveral parts from undue preſſure. But it has no place in the circulating ſyſtem of the brain; in reſpect of circulation, it is connected only with the ſcull, which it nouriſhes; its ſurface, where it touches the pia mater, is moiſtened with a halitus, or exudation, like that of other cavities; but with the brain, it has no more connection, than the pleura which lines the thorax has with the pleura which involves the lungs.

The dura mater being firmly united with the ſcull, ſends down two lamellæ, the one a perpendicular plate, dividing the great maſs of the brain into two hemiſpheres: This is the falx, which, from the deepneſs of the brain towards the occiput, and its ſmallneſs towards the fore-part, is of the form of a reaping-hook, the blade of which is broad at its root, tapering towards the point. This perpendicular ſeptum dividing the brain, ſteadies it continually in all the various inclinations of the head, preventing the right hemiſphere of the brain from gravitating on the left. The tentorium, or vaulted proceſs of the dura mater, is another partition, differing in its direction, and in its effect; it lies horizontally over the cerebellum, and defends it from the preſſure of the brain; theſe ſepta ſupport the circulation, both by dividing the maſs of this organ, and by receiving and tranſmitting the veins; and they leſſen alſo the weight of the ſeveral lobes, and the dangers of concuſſion, by dividing them.

OF THE PIA MATER.

The Pia Mater, relating more immediately to the brain, delicate, vaſcular, conveying nouriſhment to the organ itſelf, is in every ſenſe more important. It alſo is compoſed of a cellular ſubſtance, but peculiarly delicate, and adapted to the ſoftneſs of the brain; from which ſoftneſs, and its immediate connection with the brain, it has its name of pia mater. This the more immediate membrane of the brain, is delicate, vaſcular, flocculent, and not only follows all the leſſer convolutions, and lines all the cavities, but plainly ſinks into the ſubſtance of the brain, carrying the blood-veſſels with it. It is juſtly compared by Galen with the chorion of the fœtus, or the meſentery of the perfect animal. When torn away, for it will not ſeparate, it tears along with it the ſubſtance of the brain: When we introduce the blow-pipe under it, we find the air penetrating into the ſubſtance of the brain: When exudation of ſerum, or extravaſation of blood, happens from veſſels under the pia mater, ſuch

exudation raiſes the membrane in ſmall cellular elevations, tucked in from point to point, like a quilted cuſhion, which ſhows us how cloſely the membrane and cellular ſubſtance are connected; they are indeed the ſame; the ſeparating of the pia mater from the brain, is like tearing the outer or peritoneal coat, from the inteſtines; what is cellular ſubſtance within any viſcus, is membrane where it is expanded over its ſurface. Long and delicate arteries, lodged in this cellular ſubſtance, creep along in the ſulci of thoſe inteſtine-like convolutions, which mark the ſurface of the brain. Theſe arteries are minutely and exquiſitely divided before they plunge into its delicate ſubſtance; and thoſe minute arteries, or at leaſt the veins which accompany them through the ſubſtance of the brain, are ſo numerous, that we ſee in a diſeaſed, eſpecially in an injected brain, upon the face of every ſection, innumerable ſmall gouts of blood, at regular diſtances from each other, as if the cut ſurface were dotted with bloody points. Thus does the brain appear a tiſſue of veſſels, proceeding from the pia mater, and ſupported throughout by a delicate cellular ſubſtance, inviſible but by the manner in which the ſubſtance of the brain is drawn out in threads and flocculi, when the pia mater is torn away.

The pia mater is peculiarly vaſcular, *firſt*, In the ſulci ſurrounding each convolution, for there the veſſels are divided in order to enter the ſubſtance of the brain. *Secondly*, Where, being inflected over the poſterior ſurface of the brain, it paſſes betwixt the brain and the cerebellum, and is named as if it were a diſtinct membrane, the VELUM INTERPOSITUM, for there the membrane, by inſinuating itſelf betwixt the brain and cerebellum, enters into the third ventricle of the brain, and covers parts which have been eſteemed important, viz. the pineal gland, the nates, and the teſtes. *Thirdly*, At each horn of the great lateral ventricle, it is alſo peculiarly vaſcular; for though the pia mater is every where continuous, though the covering of the brain, and the lining of its cavities, are one uninterrupted expanſe of membrane; yet it may be ſaid to enter into theſe cavities, by the horns of the ventricles, and by the back of the third ventricle; in each of theſe places, the membrane ſeems, as it were, to concentrate its vaſcularity in aſſuming a new office: Where the pia mater enters the horns of the great lateral ventricles, and eſpecially where it lies along the floor of theſe ventricles, its veſſels are ſo numerous, and its veins eſpecially ſo tortuous, that it reſembles ſomewhat the red and plaited appearance of a ſergeant's ſaſh; and this plexus, or net-work of veſſels, is named the Plexus Choroides. The veins are in theſe plexus, as in all vaſcular parts of the body, more conſpicuous; and ſome of the veins returning blood from the internal ſurfaces of the ventricles, and from the ſubſtance

of the brain, are ſeen livid through its pellucid ſubſtance: Theſe veins, riſing from the floor of the ventricle, join the plexus; and from the two plexus choroides, large veins run backwards towards the velum, or that part of the pia mater which is interpoſed betwixt the brain and cerebellum, where, finally, a great venous trunk is formed, named Vena Magna Galeni.

The Pia Mater thus univerſally involving the brain, is attached to the dura mater only along the line of the Falx and Tentorium: there the veins of the pia mater deliver their blood. The veins riſing from among the convolutions on the ſurface of the brain, run towards the falx, over the ſurface of each hemiſphere, and pour their blood, by many large branches, into the longitudinal ſinus, or great vein, which runs along the doubling of the falx. The blood of all the ventricles is delivered another way, viz. through the veins of the plexus choroides, into the vena magna Galeni. By the fulneſs of the veins on the ſurface,—by the appearance of the plexus and velum,—by the colour of the brain,—and by the more or leſs numerous dots of blood on its cut ſurface, we judge of the ſtate of vaſcular action which has prevailed within the brain before death *.

OF THE FORMS AND INDIVIDUAL PARTS OF THE BRAIN.

The maſs of the brain is divided by the Falx into two Hemiſpheres; by the Tentorium the brain is ſeparated from the Cerebellum; and each of theſe is ſubdivided again into leſſer Lobes, implying no peculiarity of function, but correſponding with the ſeveral copartments of the ſcull: for, the anterior, middle, and poſterior lobes of the brain, correſpond with the ſeveral concavities of the os frontis, the oſſa parietalia, and the os occipitis. That the brain is thus divided into brain and cerebellum, hemiſpheres, and lobes, is what I need hardly remind you of. In place of deſcribing theſe minutely, I ſhall attempt to convey a rational and general view of the whole. It would appear, that the ſurface of the brain is varied, and undulated; divided by deep grooves into little convexities, which (from the turns reſembling thoſe of the bowels) are called convolutions, chiefly to extend its ſurface, to multiply its points of contact with the pia mater, and to receive all its profuſion of veſſels. It would next appear, that the cavities of the brain, the lateral ventricles, larger than

* The pia mater is exquiſitely deſcribed by Galen, *De Uſu Partium*: "Vertugratia, tenuis meninx cerebrum ſtabilit ac tegit, et præterea vaſa omnia, quæ in ipſo ſunt, colligat; ſimilis enim eſt chorio fœtus atque animalis meſaræo."—Cap. viii.

is uſually ſuppoſed, are deſtined for no other purpoſe, than to extend its ſurface, to receive inflexions of the pia mater on that ſurface, and to diſcharge the blood of the ſubſtance and internal ſurfaces by the veins of the plexus choroides, and the vena Galeni. Hence it is provided by nature, that the cerebral ſubſtance, though apparently a globular maſs, is in truth all of one equable thickneſs *; for the ventricles begin ſmaller at the anterior lobe of the brain, ſwell out in the middle or greater lobe, and decline to a point again in the poſterior lobe, thoſe pointed extremities of the cavities being named, the anterior and poſterior horns.

It would appear, that the forms of the inward parts are mere bulgings, neceſſarily depending on the external forms. The roof of the two great lateral ventricles is arched, uniform, and ſimple, correſponding with the uniform convexity of the brain. The floors of the ventricles are undulated, correſponding in their forms with the eminences which the conjunctions of the crura cerebri, the irregularities of the baſe of the ſcull, and the giving off of the nerves, create. If we turn up the brain from behind, where it lies on the Tentorium, and proceed to ſeparate it from the cerebellum, we find, that we tear our way into what is called the third ventricle, and we ſee its eminences, viz. the Nates, Teſtes, and Pineal Gland: but the third ventricle is in truth no cavity: Where the poſterior lobe of the brain reſts upon the cerebellum,—where the crura cerebri, and the crura cerebelli meet,—where the pia mater paſſes in the form of vaſcular velum betwixt the brain and cerebellum, there is naturally a triangular interſtice, but no cavity, for it is occupied by the velum, or moſt vaſcular part of the pia mater. Neither is it open, for, by the interpoſition of this membrane, the pia mater, or, as it is here named, the velum interpoſitum, the parts mutually adhere: As for the tubercles, viz. the tuberculi quadrigemini, the nates, and the teſtes, they are no more than the natural forms produced by the meeting of the crura cerebri, and cerebelli; the nates, or larger tubercles, being formed by the crura cerebri, the teſtes, or ſmaller ones, by the crura cerebelli. The pineal gland, a ſmall round tubercle of medullary and cineritious matter, is ſeated in the centre of theſe, covered and bound down by the velum, and only to be ſeen when that is raiſed, which muſt be done with delicacy, leſt it tear up the gland.

It is the continued courſe of the crura medullæ oblongatæ, lying ſide-by-ſide with each other, that forms that longiſh ſlit which we call the Fourth Ventricle, cloſed, as the third ventricle is from behind, by the pia mater. The hole, or Iter a

* "Omnibus igitur iſtis prominentiis (viz. convol. cerebri) correſpondet ventriculorum cavitas, &c. ita ut univerſum cerebrum ſit veluti inſignis quidam cortex ambiens predictas cavitates."—*Skenkius.*

Tertio ad Quartum Ventriculum, is juſt the circular opening formed betwixt the two crura cerebri, and crura cerebelli. The continued medullary productions of the brain, the Corpora Olivaria, and Corpora Pyramidalia, as juſt the ſwelling out of thoſe medullary matter into round and pyramidal bulgings, where the continued ſubſtances of the brain and cerebellum, viz. the crura prolongata, terminate in the ſpinal marrow.

The Thalami Novorum Opticorum, and the Pedes Hyppocampi; the ſwelling and bulging parts, whether of medullary or of cineritious ſubſtance, within the great cavities, called lateral ventricles, are neceſſary counterparts of the external forms; and correſpond with the ſhapes of the poſterior lobe of the brain, where it forms the cortex or ſurrounding ſubſtance of the ventricle, and with that of the crura cerebri, or extenſions of the medullary ſubſtance of the brain, where they firſt aſſume the form of crura. If you would have a general conception of the organization, look not to a vertical ſection of the brain in the dead body, for the parts cannot be fairly divided, and will not keep their forms or relations to each other; but look to a drawing of the vertical ſuture, that, for example, in my brother's plates of the brain, plate 7. where you will be able, after reading the deſcription, and comparing part, to familiarize your mind with theſe intereſting concluſions: That the energy of the brain, its relation both to body and mind, depends not on its form, but on its peculiar matter: That the powers and energy of the brain are continually regulated by the ſtate of its circulation; excited when its vaſcular action is excited; and deadened when its veſſels are oppreſſed. Examining, in this drawing of my brother's, the vertical ſection of the brain, you will perceive, from the deeper colour of the cineritious or cortical part, that it is more vaſcular; this peculiarity of colour we know to be from its vaſcularity, for, from grey it changes to green, and livid in the ſuppurating or inflamed brain, in conſequence of the turgid ſtate of the inflamed veſſels, or of actual extravaſation of blood. In the medullary, or white ſubſtance, you will obſerve in every ſection large and numerous gouts of blood, which are ſections of the veſſels, yet undivided, and going towards the cineritious or cortical part. You will perceive, that for the purpoſe of extending the vaſcularity of the brain, nature has extended the ſurface; that it is hollow, —that the pia mater, which covers the convoluted ſurface of the brain, paſſes into its cavities, and is there more vaſcular; that theſe cavities, far from being ſmall, or their parts difficult of inveſtigation, are extremely large, and environed ſo by the ſubſtance of the brain, that the brain is (to uſe the expreſſion of

Skenkius) " veluti inſignis quadam cortex ambiens predictas cavitates." Thence all parts of the brain are equally near to ſome ſurface, by which the veſſels of the pia mater may furniſh blood; and thence the floor of the ventricles return as large veins to the ſinuſes of the occiput, (viz. the vena magna Galeni, and its branches), as the external ſurface does to the great longitudinal ſinus. You thus perceive, that the brain, which ſeems a great and ponderous maſs, of unequal bulk, having ſmall, big, and middle lobes, is yet a ſubſtance of uniform thickneſs, for the lateral ventricles are larger in their centre, when the maſs of the brain is large, and ſmall towards their extremities, where the anterior and poſterior lobes are ſmall. Thus do the great lateral ventricles equaliſe the ſubſtance of the brain, and reduce it, notwithſtanding its irregular outward form, to one thickneſs of ſubſtance. The openings of theſe ventricles admit the vaſcular membrane, which is to line the internal ſurfaces of the brain, while the leſſer cavities of the third and fourth ventricles are ſtill more cloſely lined by the ſame vaſcular membrane, and all ſimilar interſtices left by the ſmall parts of the brain, where they touch and adhere to one another.

Contemplating the vertical drawing, you will ſo follow the great outline with your eye, as to refer each internal form in the ventricles of the brain, to the external bulgings. You will find the Tuber Annulare, the Tuberculi Quadrigemini, and Corpora Olivaria, and Pyramidalia, to be merely the bulging forms created by the junction of the crura cerebri, and the giving off of the ſpinal marrow; and thus, while you learn to eſtimate this organ according to its peculiar nature, and explain its conditions and aptitudes, according to its original conſtitution, and the ſtate of its vaſcular actions; you will begin to ſuſpect, that thoſe marked parts of the brain, ſo long the ſubject of contemplation with phyſicians and philoſophers, have no very peculiar diſtinction, but are accidental only. How can it be that cavities, which are ſo obviouſly deſigned for extending the ſurface of the brain, ſhould be laboratories of faculties; that memory, imagination, and judgement, ſhould have diſtinct reſidences; that the pineal gland, or other tubercle, ſhould be pre-eminently the ſeat of the ſoul itſelf, as if the ſoul were a material and definable exiſtence, when theſe very parts are not more curiouſly or perfectly formed in man, than in the ox at the ſtall.

OF THE SENSIBILITY OF THE SUBSTANCE OF THE BRAIN.

By diverting, for a little while, your attention from certain experiments of philoſophers and phyſiologiſts, deſigned to extort from the ſufferings of animals, proofs of the ſenſibility of the brain, by directing your attention rather to the plain broad facts which the wounds occurring in war and battle, or even the ordinary accidents of life, preſent to the ſurgeon; I am ſure, I try this great queſtion by the teſt of common ſenſe, and open it in the way moſt advantageous for you, by laying before you facts and views unequivocally and practically uſeful. The ſurgeon is accuſtomed to ſee deep wounds, and ſtill deeper ulcerations of the brain, producing not the ſlighteſt effects on the mind, and hardly affecting even the body. Were he for a moment to doubt his ſenſes, and truſt to his reaſon,—to ſuch reaſoning, at leaſt, as that which deſcribes the brain, the material configuration of the brain, as the organ of the ſoul, or its ſeveral prominences and hollows, as the diſtinguiſhed ſeat of its various faculties,—he muſt be abſorbed in wonder and amazement, at ſeeing men killed ſometimes by a blow of the fiſt, yet hardly affected in caſes where weapons, or fractured bones, have pierced deep into the brain; and ſtill more muſt he continue amazed, to ſee the actual ſubſtance of this reputed organ of the ſoul undergoing ſuch ſuppuration as other parts ſuffer, and healing like them.

Philoſophers have never had the modeſty to queſtion for a moment the convenient opinion they had conceived, viz. that the brain, to which every act of volition and ſenſation ſeems to be referred, was itſelf endued with exquiſite ſenſibility. This was firſt denied by practical ſurgeons: Long before Haller, or his illuſtrious pupil Zin, had begun to think about the ſenſibility of the brain, Wiſeman, who had, during the civil wars of England, witneſſed all variety of wounds, declared in one plain blunt word, that the "brain was an inſenſible body." This he had learnt from viſible and tangible proofs of the fact, not by experiments on dumb animals, which are to howl their ſufferings, but by wounds in men, who could expreſs what they felt; but what is moſt ſurpriſing, men fatally wounded have, in many inſtances, had no ſufferings to deſcribe, and have retained every power and faculty of mind and body, even when the brain was deeply injured by weapons. It is no paſſion for the marvellous, that has induced authors of the higheſt reputation to ſtate this fact in every variety of ſhape;—their ſenſes could not always be deceived; they could not always imagine falſely, that they handled at each

dreſſing the very ſubſtance of the brain. They could not pledge their good repute on a fact at all doubtful, eſpecially when in direct oppoſition to every prejudice. But, indeed, ſuch facts ſeem incredible, only becauſe, like many valuable diſcoveries, they are oppoſite to all our pre-conceived notions. "The enemy (ſays Wiſeman) having driven in our out-guards at Truro, they continued purſuing them; and a trooper wounded between the right brow and the ear, ſpying me in the crowd, importuned me earneſtly to dreſs him, and would admit of no excuſe. We ſtopped at an apothecary's houſe, on the right hand going out of the town towards Perin; I called to the apothecary's ſervant to bring ſomething to dreſs him; meanwhile I haſtily lifted up the bloody hair, and ſaw a quantity of brain lie amongſt it. I took it up with my fingers, and ſhewed it him, the ſight whereof ſo calmed his paſſion, that I had liberty to flee from the enemy, who had entered the town*." "In battles and ſieges of towns, (adds Wiſeman), we meet with many ſuch wounds; after extracting the pieces of the fractured ſcull, we dreſs up the brain and membranes with a ſyndon of ſilk, or of ſoft linen dipped in a warm digeſtive. Though ſurgeons have pretended to dreſs the brain with one kind of medicament, and the membranes with another, that is not poſſible to be done. In the care of theſe wounds, *the brain I conſider as an inſenſible body*, and the dreſſing of it conſiſts in keeping it within its membranes; if this can be done, as in ſmall wounds of the brain it doth ſometimes happen, then the patient may recover †."

Such opinions, expreſſed by practical men, who make their appeal to their daily experience "in battles and ſieges," muſt impreſs your minds a great deal more than the moſt ingenious experiments, for they are imagined for a preconcerted purpoſe, and executed with addreſs favourable to that purpoſe. But when we reflect on the infinite variety of ſuch proofs, produced by practical authors of all ages and na-

* Wiſeman, p. 187.

† "At the ſiege of Melcomb-Regis, a foot-ſoldier of Lieutenant-Colonel Ballard's, by the grazing of a cannon-ſhot, had a great part of his forehead carried off, and the ſcull fractured into many places, and ſome of it driven with the hairy ſcalp into the brain. The man fell down as dead, but after a while moved; and an hour or two after, his fellow-ſoldier ſeeing him endeavour to riſe, fetched me to him. I pulled out the pieces of bones and lacerated fleſh from amongſt the brain, in which they were entangled, and dreſſed him up with ſoft folded linen, dipped in a cephalic balſam, and with emplaſter and bandage bound him up, ſuppoſing I ſhould never dreſs him any more. Yet he lived ſeventeen days; and the fifteenth day walked from that great corner-fort over againſt Portland, to the bridge which ſeparates Weymouth from Melcomb-Regis, only led by the hand of ſome one of his fellow-ſoldiers. The ſecond day after he fell into a ſpaſmus, and died, howling like a dog, as moſt of thoſe do who have been ſo wounded. About the ſame time, a maid-ſervant was ſhot into the right ſide of her head by a muſket-bullet deep into the brain. She lived ſo long, till that lobe of the brain wrought out or corrupted."

tions, by thoſe among whom no colluſion could be ſuſpected, we cannot refuſe an unqualified aſſent to this concluſion of Wiſeman, that "the brain is but an inſenſible body;" and there is a ſort of conviction ariſing from narratives by one or two good authors, ſo much more perſuaſive than that ariſing from the moſt ample catalogue of facts and creditable names, that I cannot refuſe myſelf the pleaſure of ſtating a few other caſes.

" * Balthaſar Brem, a robuſt young man of twenty-ſeven years of age, reeling home tipſy from a fair, was, after various quarrels, wounded in the temple with a halbert, the wound extending nearly from the eye to the ear, and penetrating the temporal bone, ſo as to admit the point of the little finger. He walked half a mile to the village of Groſſelſingen, when the bleeding was ſtemmed by ſome charm; and from thence he walked to another village, Allerheim, three miles farther, and ſat down again in a tipling-houſe. He was thus wounded on the 24th of June; on the morning of the 25th, when in his maſter's houſe, he was proceeding very imprudently to waſh his wound with cold water; he was diſſuaded, but could not be prevailed on to think ſeriouſly of the wound, or go to a ſurgeon. At laſt he went to a quack, who cloſed the wound with a ſimple plaſter, boaſting, that during ſix years in which he had followed the army, he had ſeen worſe wounds heal without the ſlighteſt ill conſequence. On the 26th, he complained of pain in the neck, back, and loins, which, however, were relieved by gentle friction. On the 27th, he return-

* *CAPITIS VULNUS AD CEREBRUM PENETRANS.*

" Balthaſar Brem, Oſtheimenſis in principatu Oettingenſi, juvenis robuſtus 27. annorum, die 24. Junii 1682, ex nundinis Nordlinganis, non procul ab urbe, ebrius, ob lites in via obortas, bipenni in tempore dextro prope angulum minorem oculi vulneratus fuit; vulnus inflictum pertigit fere ad aurem uſque, ac deprehenſum fuit os temporum perforatum fuiſſe, ut apicem parvi digiti admiſiſſet. Vulneratus ad pagum Groſſelſingen, dimidio milliari a loco pugnæ diſtantem, properavit, ac ſanguinem ſuperſtitione quadam ſiſtere curavit, indeque ad pagum Allerheim, prope per milliare Germanicum, pedes ivit atque ibidem in hoſpitio rurſus bibit. Die 25. Junii, mane, in ædibus domini ſui vulnus frigida eluere voluit; monitus a lotione, deſtitit; interea vulnus parvi pendens vix perſuaderi potuit, ut chirurgi ope uſus fuiſſet; tandem adiit balneatorem, qui vulnus ſimplici emplaſtro operiit. Jactabat ſe graviora vulnera, dum per ſex annos militiam ſequebatur, ſine damno perpeſſum fuiſſe, nec tantillum ſibi obfuturum. Die 26. Junii, conquerebatur de dolore cervicis, dorſi et lumborum, quamprimum partes iſtæ leviculæ linteo fricabantur, agebat ſe melius habere. Die 27. Junii, Oſthemium adiit, ac paternas ædes repetiit. Die 28. Junii, magis delirabat, ac ſitus corporis abſurdos ſuſcepit, ſine convulſionibus; quamprimum enim ſpina levicule rurſus perfricabatur, quietus jacuit, beneque compoſitis artubus. Nunquam vomuit; nemo adſtantium mortem timuit, cum ſemper vegetus admodum appareret. Quotidie vulnus a peritiore balneatore deligabatur; vulnus nullum pus hucuſque fudit. Die 29. Junii, mane, tribus horis placidiſſime dormire videbatur, verum his elapſis, non amplius evigilavit, et reſpirare deſiit.

" Die 30. Junii, Exc. D. D. Amadeus Megerlin Sereniſſimi Principis, ac Domini Alberti, Principis Oettin-

ed to his native village to his father. On the 28th, he became delirious, and twiſted himſelf with ſtrange contortions, but without any convulſion ; and again, when the courſe of the ſpine was gently rubbed, he lay quiet, and in the moſt natural poſtures. He vomited none; his friends were in no degree aware of his danger, and leaſt of all apprehenſive of ſudden death, for he ſeemed freſh and healthy. The wound was daily dreſſed by another and a better *barber ;* no pus had as yet been diſcharged from the wound ; when, on the 29th, while he ſeemed for three hours to be in a quiet ſleep, his friends, upon approaching his bed, found him dead.

genſis Archiater cum chirurgo caput aperuit; dum olla cranii aufferebatur, multum cruoris nigri, fœtidi et fluidi, in dextro latere emanavit ; illa ablata deprehenſum fuit cuſpidem bipennis per meninges in ſubſtantiam cerebri penetraſſe ; meninges erant mucoſæ, et ſubſtantia cerebri circa vulnus flaccida et fuſca ; neque in ventriculis, neque in occipite grumos ſanguineos aut alium humorem peregrinum invenerunt, quamvis præcipue de dolore cervicis ad lumbos uſque diffuſo vivus adhuc conqueſtus fuiſſet. Poſt obitum, caput, truncus, ſcrotum, et artus, valde intumuerunt.——*Ex communicatione Excell. D. D. Megerlini Oettingæ, die* 1. *Jul.* 1682.

SCHOLIA.

I.

" Graviſſimo huic vulneri per os temporis, meninges in ſubſtantiam cerebri penetranti nulli capitis dolores, nullæ convulſiones et diu nullus ſopor ſupervenit, quamvis intra cranium cruor cum ichore putrido jamque fœtente fluctuaret, quia per vulnus ichori aliquis exitus patuit. Ob eandem cauſam pedes aliquot milliaria Germanica confecit, vulnus ſprevit atque neglexit, cum in reliquo cerebro ſufficientes ſpiritus animales conficerentur, liberque aditus in nervos pateret.

II.

" Delirare cœpit jam die tertio, quia non ſolum cruor, ſed etiam ſubſtantia cerebri, cum meningibus corrumpi inceperunt ; die quinto incrementa ſumſit delirium, quod ex abſurdo ſitu patuit, et falſa perſuaſione dolorem cervicis, dorſi et lumborum ſola frictione, etiam blandiſſima, demulceri et evaneſcere ; quamvis forte negari non debeat illum vere doluiſſe, ichore tenuiore per oſtium ſacrum in fiſtulam medullæ ſpinali dicatam illabente, qui, ſeu humor peregrinus, moleſtiam peperit etiam quantitate paucus ; nihil enim cruoris in occipite repertum fuit.

III.

" Sopor profundus die ſexto ſupervenit, quia portiones tenuiores ichoris corrupti per laceram cerebri ſubſtantiam ſe profundius, et uſque ad medullam intimiorem immerſerunt, ſubſequente hora tertia finita apoplexia et morte.

IV.

" Forte ſervari potuiſſet, ſi cruori liberalior exitus paratus, et vulnus curioſius deligatum a chirurgo perito fuiſſet : Sic Romæ 1646, menſ. Dec. vidi ab Excell. D. Nicolao Larche Lotharingo os temporis fractum terebra perforatum, ſanguinique effluvium conciliatum fuiſſe ; cavebatur ſtudioſe, ne aer frigidus ad cerebrum penetraret, ac linteolum ſericeum intrudebatur ſiccum, aliudque pauxillo melle roſaceo illitum, tegebaturque emplaſtro de betonica, ſimulque imperabatur victus ratio tenuiſſima ; quibus diligenter obſervatis æger convaluit.

V.

" Poſt obitum, collum, truncus, artus, et ſcrotum admodum intumuerunt, ut in ſuffocatis et ſtrangulatis fieri ſolet, ſanguine copioſo in vaſis fermentante, ac in ſpatia ſubcutanea muſculorum aliaque partium mollium effuſo.

" On the 30th of June, the head was opened. Upon tearing away the ſcull-cap, much black, fætid, and very liquid blood, iſſued from the right ſide, and the halbert was found to have penetrated through the membranes into the ſubſtance of the brain. The membranes were in a ſtate of ſuppuration, and the ſubſtance of the brain was flabby, diſcoloured, and browniſh."

" A tailor (ſays Meekren), named Bernard Weghuyſen, was ſo wounded on the right parietal, that many fragments of the bone penetrated not only through the membranes, but even to the ventricles of the brain, a fact of which many, at the opening of the body, were witneſſes; yet this man walked home unaſſiſted. By the order of the magiſtrates, and the requeſt of his hoſt, I went to viſit him; and with the help of proper inſtruments, we extracted from the depth of the brain, from its central parts, a piece of the cranium nearly three inches long, beſides various leſſer fragments. This man, who was put into our hands on the 23d of February, died the 11th of March; and from the day we firſt viſited him, to that immediately preceding his death, there flowed daily through the wound a ſpoonful of the very ſubſtance of the brain, his ſpeech, intellect, and judgement, being all along perfect; nor was it till death was faſt approaching, that the delirium, fever, paſſy, or other ſymptoms, came on *."

* " Bernardus Diderici Weghuyſen, ſartor, gravi læditur ictu dextro oſſe parietali, ſic ut fragmenta varia cranii vulnerati non ſolum meningem duram, tenuemque læderent, ſed et ad ipſas uſque ventriculorum cerebri cavitates ſe dimitterent, et quidem vehementia ſumma, uti in aperto poſt mortem cadavere ſpectatoribus notare licuit.

" Vulneratus domum petit, nullius auxilium implorans; juſſu ampliſſimi magiſtratus civitatis noſtræ, rogatuve hoſpitis, eum acceſſi; cujus ex cerebri interioribus incredibilis magnitudinis particulam a cranio læſo ſeparatam, præter fragmenta alia minora, inſtrumenti commodi beneficio extraximus. Artis noſtræ ſtudioſis veram fragmenti dicti quoad figuram et magnitudinem delineationem exhibere valde conveniens ducimus, eſt ea quam hic damus.

" Die 23. Februarii, curæ noſtræ commiſſus æger prædictus qui 9. Martii obiit. Conſideratione noſtra dignum quam maxime in hoc ægrotante, quod ſingulis diebus, a tempore eo quo ipſum acceſſimus, uſque ad diem mortem penultimo præcedentem, ſubſtantiæ cerebri quantum cochleari contineri poterat per vulneratum locum effluxerit, loquela, ingenio, judicio, integre ſe habentibus. Aſt inſtante ut diximus morte, febris, delirium, hemiplegia, inter alia ſymptomata, ſuperveniebant.

" Materiæ huic, quæ expreſſionis hiſtoriam, variaque ſymptomata, exhibet, antequam finem imponamus, conſultum omnino cenſemus exemplum priori ſimile, aſt cujus terminus longe felicior, hic proponere. Chirurgus hujus loci eximius Bernardus Heems, cujus curæ commiſſus æger, quique mediorum convenientium opera priſtinæ valetudini eum reſtituit, ejus nobis copiam fecit, literis ea de re ſcriptis, inſcriptiſque nobis.

AMICISSIME,

Cum conſtet, rerum variarum, rarius occurrentium, perſcrutatorem te eſſe, arctaque jam a multis annis nos junxerit neceſſitudo, intermittere haud potui, quin ſingulare ſingularis fracturæ cranii in puero 10 aut 12 an-

A caſe is related by Fallopius, of a boy, the ſon of one Peter Wartz, who had his occipital bone ſo fractured by the falling of a window-ſaſh, that the edge of one piece of bone was depreſſed within the other, and there was left no exit for the matter. Severa points of the bone were driven through the dura mater into the ſubſtance of the brain. In pulling out theſe ſpiculæ, the ſubſtance of the brain was ſo lacerated, that at each dreſſing, the ſurgeon took away as much of its proper ſubſtance, as would fill a walnut-ſhell; and on the 3d day, he took away three ſpoonfuls, and all this without the ſlighteſt injury to the mental powers, which continued perfect, though the wound was ſuch as could not but prove mortal. The patient died on the ſixth day *. I will not allow myſelf to dwell upon theſe facts, nor even to tranſlate a ſimilar example annexed to it by Tulpius, but proceed to preſent to you one or two examples, ſuch as may ſerve to prove this univerſal fact, " That the intellect or ſenſes are but little affected by the moſt horrible, the moſt fatal injuries of the brain, if only ſuch injury be local."

A caſe which I mentioned in my Anatomy of the Arteries of the Brain, I will here venture to repeat; none can be more intereſting, nor prove more directly this general theory: " A young married woman, carrying in her arms her firſt child, then about ſix months old, ſlipped her foot, and was ſenſible of a ſlight ſhock, which reverberated through her head; but, as this happened on plain and even ground, ſhe did not fall down. She was inſtantly ſenſible of a pain in the right ſide of her head; it was ſo diſtinct and circumſcribed, that ſhe imagined ſhe could touch and cover the particular ſpot with the point of a finger. This pain, though lightened at intervals, never left her to the hour of her death. She was able to walk home, carrying her child; ſhe attended to her little family-matters, and continued to give ſuck; but, on the evening of that day, was ſeized with ſickneſs, not violent, like that of any febrile diſeaſe, but gentle, like the eaſy vomiting of a pregnant woman."

norum, ex caſu gravi, inductæ, tibi communicem. Frontis hic os, aliis coronale dictum, læſum adeo, ut particula quædam ſeparata, quæ et meninges vulnerabat et cerebrum ipſum, præterquam quod externa capitis integumenta vulnus exhiberent inſigniter amplum. Locus læſus ſubſtantiæ cerebri notabilem quotidie exhibebat quantitatem, quam vel ipſe, præter chirurgos alios, non ſemel inſpexiſti. Nec vomitus, nec delirium, nec ſanguinis per nares, aures, aliave loca, fluxus in ægrotante hoc unquam obſervabantur, inſignis licet amplitudinis apertura, reſtitutus brevi æger. Conſiderabilem hunc caſum tibi publicoque haud invidere placuit. Vale.

Bernardus Heems."

* Tulp. lib. i. obſ. 1.

" She continued ſick for two days, with ſlight headach, but ſtill was out of bed all day long, went about her houſehold affairs, and had no ſingle ſymptom which ſhould have led us to ſuſpect the fatal nature of the accident which had happened. During the night of that day in which the accident happened, ſhe got up, to reach for ſome cooling drink, which ſhe had placed beſide her, but felt extremely giddy, was obliged to ſupport herſelf by a cheſt of drawers which ſtood by her bed, and went immediately to bed again. On the evening of the 2d day, ſhe got out of bed, made tea as uſual, remained out of bed during the evening, and had no complaint except the continual ſickneſs, a ſlight pain of the head, and giddineſs ſtill ſlighter; ſhe expired during the night. Her pulſe all along beat low and weak, never faſter than ſixty in the minute.

" When I was brought to open the body, I had heard nothing of the pain in the head, which, though ſlight in degree, was fixed and conſtant; without a knowledge of this circumſtance, with nothing to direct me to the ſeat of diſeaſe, the ſymptoms preceding her unexpected death could not be otherwiſe than perplexing. *Firſt*, The ſudden ſlipping of the foot, and the continual ſickneſs which enſued, ſuggeſted the ſuſpicion of hernia; but no ſuch complaint had ever been diſcloſed to her relations; and, upon opening the abdomen, no concealed nor obvious hernia could be found. *Secondly*, We were informed of a palpitation to which ſhe had been ſubject, but of this ſhe had complained chiefly about the period of her firſt menſtruation, and for ſome years preceding her marriage; the palpitation appeared to have been hyſterical, yet, upon opening the thorax, the heart was found greatly enlarged, and crammed with dark and grumous blood. But, *thirdly*, A new ſcene opened to us, when the head was diſſected, and it appeared, that the enlargement of the heart, like that of the liver, which ſo often accompanies concuſſion of the brain, had ariſen from the languid action of the heart, and that torpor of the whole ſyſtem which characteriſes the ſtate of coma. I now was, upon retiring from the diſſection with the relations, informed for the firſt time, that the ſudden ſlipping of the foot, had been followed by a pain almoſt as ſudden in the head; that it was pointed, limited to one ſingle ſpot, inceſſant, accompanied with continual vomiting, or deſire to vomit, and with giddineſs during the night. Upon opening the head, I found the dura mater of a very unuſual appearance, livid, or rather of the colour of the gizzard of a fowl, with green and changing colours. Having cut it up, the pia mater appeared like red-currant jelly, with freſh coagulated blood, ſo firmly attached to it, that it ſeemed as if injected into its very ſubſtance, and incorporated

with it *. Upon cutting and tearing up the pia mater, each convolution of the brain was ſurrounded and ſeparated from that next it by coagulated blood. Upon cutting into the ventricles of the brain, that of the right ſide was found to contain four ounces of pure and coagulated blood; the opening of the cavity preſented at firſt view the ſame appearance as if we had opened one of the auricles of the heart; the blood was very dark, and very firmly coagulated, and was ſpued out from the cavity by the preſſure of the ſurrounding parts; the coagulum became gradually firmer and whiter as we traced it inwards, till it terminated in a white and ſtringy clot, which ſtuck about the mouth of one of the branches of the middle artery of the brain."

Thus we perceive, that deep and deadly wounds, or even burſting of the arteries of the brain with great extravaſation, affect the intellect very ſlightly; and you muſt well remember, that in all my deſcriptions of ſuppurating brain, both in thoſe who ſurvived, and in thoſe who died, I mentioned no more formidable ſymptoms, than a ſlight confuſion of head, unuſual terrors during ſleep, a ſlight trembling of the hands and knees †. Not only were ſuſpicions raiſed of the brain being "an inſenſible body;" practical ſurgeons had anticipated, by actual obſervation, the cruel experiments of phyſiologiſts: but though the ſurgeon, (with every advantage of an intelligent ſubject, whoſe powers of mind remained often uninjured, after the moſt dreadful wounds), had long aſcertained the inſenſible nature of the brain; yet has the phyſiologiſt moſt unrelentingly perſevered in the inquiry; not a reptile that has limbs to quiver under torture, not a creature that can howl its ſufferings, but has been made the teſt of the ſenſibility of the brain. We cannot refrain from taking a lively intereſt in theſe experiments, and cannot but rejoice that they have been performed, never, I hope, to be repeated; they have been done with perfect accuracy by Zin, the favourite pupil of Haller, and with a ſavage deliberation, which makes the blood run cold, in following the ſeveral ſteps of the proceſs. Every part of the brain, diſtinguiſhed by any thing peculiar in its form or colour, has been imagined to be the peculiar ſeat of ſome faculty, if not of the ſoul itſelf, from the centrum ovale, or great medullary maſs of the brain, to the pineal gland, its moſt inſignificant particle, "where the ſoul has taken up her reſi-

* Obſerve, that this is the appearance I meant to intimate, when ſpeaking of the cellular nature of the pia mater, and of its connection with the ſubſtance of the brain.

† See the caſes of Sharp, and of the ſoldier-lad Bennet, p. 353, 425.

dence, and ſits dabling like a tad-pole all day long, winter and ſummer, in a puddle*." The centrum ovale, the corpus calloſum, and the cerebellum, which are the great medullary maſſes; the corpora ſtriata, the nates and teſtes, and the pineal gland, which are the particular forms of leſſer parts or prominences of the brain, have been ſucceſſively affirmed to be each the ſeat of the ſoul. Vieuſſens believed that the ſoul, reſiding in the whole brain, had the ſimple ideas from the various organs of ſenſe firſt impreſſed upon the corpora ſtriata, and finally recorded in the centrum ovale. Perault believed the ſoul to be univerſally diffuſed through the nervous ſyſtem. Deſcartes believed it to be concentrated in the pineal gland. Blanchard placed it in the ſpinal marrow. The ſoul, as Zin tauntingly remarks, has been, by every new ſpeculator, driven from her old dwelling, to ſeek for ſome convenient reſting-place; from point to point, it had been driven into the corpus calloſum, or great medullary commiſſure of the brain, and thence it was finally driven by Zin at the point of the trocar down through the infundibulum, altogether out of the brain.

Zin, in one great and concluſive experiment, tried the ſenſibility of each ſeveral part and portion of the brain: He fixed a big dog upon his table, and, having perforated the ſcull with the trepan, ſcraped the dura mater, and pricked, with the point of the ſcalpel, that membrane, in which chiefly was ſuppoſed to reſide the ſenſibility of the brain, and of all the membranous parts of the body, but with ſo little appearance of exciting ſenſation, that he believed the dog apoplectic, till, upon irritating the flaps of the diſſected ſkin, he howled loudly. Next he tried the ſenſibility of the brain itſelf; he puſhed his probe deep into the cortical ſubſtance of the brain, and tortured that portion in various ways, but not a ſtruggle enſued. He puſhed his probe deep into the medullary ſubſtance of the brain, then the dog howled, but was not convulſed; he went about the chamber tottering as if drunk or ſtupid. Again he ploughed the probe deep into the brain, and the dog howled again, went ſtaggering about the room, and in a few minutes began to run round in circles like a mill-horſe, ſtaggering and falling from time to time, but riſing always, and running round again. Soon after, the creature fell down all at once: being ſet upon his feet, he could no longer ſtand: his body, when laid upon the table, was curved to one ſide by paralyſis; being whipped, he howled. We are ſoon after relieved from the horrors of this detail; after drawing ſome long breaths, (ſays Zin), the creature expired: "Brevi, poſt profundas reſpirationes, moritur." In this, and other mercileſs experiments, each individual part of the brain was injured, irritated,

* Sterne.

or deſtroyed, without the remoteſt proof of the individual reſidence of the ſoul in one part, or of its ſeveral faculties in its ſeveral parts: From every experiment, from every accidental wound, it has appeared, that its ſubſtance is inſenſible, the ſhape and form of its parts accidental, and importing nothing; its qualities apparently the ſame in man and animals. The phyſiologiſt cannot but acknowledge the ſame perfect forms, the ſame obvious ſtructure, the ſame proportions of cortical and cineritious ſubſtance, the ſame influence over the ſtomach, and over muſcular motion, the ſame reference to all the ſenſes in animals, as in man; and the philoſopher of the ſchool of materialiſm muſt be forced to acknowledge ſome eſſential diſtinction betwixt man and the lower creatures, which matter, or its laws or properties, never can explain. The palate, the noſe, the ear, are not more perfectly formed in animals than the brain.

What does this mean, or what does it imply? That the brain, whoſe connection with the ſenſes, and whoſe dominion over the whole ſyſtem is ſo ſtrikingly obvious, ſhould be wounded with weapons, pierced with inſtruments, waſted by ulceration, diſordered by extravaſations of blood, without any of thoſe immediate conſequences which we are naturally led to expect? One fact, at leaſt, and fairly worth all the others, is proved, viz. that no partial injury affects the ſenſes, the intellect, or the vital motions; that the injury which is dangerous, is that which affects the whole organ. It is this which marks the difference betwixt wounds and bruiſes, falls and blows. A wound affects a part only; a ſhock, or fall, affects the whole; and it is only when partial injury terminates in general oppreſſion, that life is in danger. When Zin ſtruck his trocar through the ſcull into the brain, or cerebellum, the dog ſuffered only a temporary diſorder; there appeared no want of vigour, though the head remained thus transfixed, and he lived ſometimes till morning, little affected, and free from pain; but the moment the trocar was withdrawn, when blood from the arteries, or the ſinuſes, diffuſed itſelf upon the brain, he fell, became inſenſible, and ſoon expired *. Thus we often find a patient wounded deeply in the brain with weapons, or fragments of the ſcull, able to walk to his ſurgeon to have his wound dreſſed; while thoſe injured by a ſhock, or knocked down with a blow of the fiſt, fall down inſenſible, never to riſe again. This leads me to a concluſion every way worthy of your notice: The ſhort parallel which I am now going to lay before you, will direct your attention from local injuries, to the general condition of the organ; for whether a man lies torpid from diſeaſe, or from a blow,

* Vid. Zin, p. 445.

ſtill you are to reflect on the ſtate of the arterial circulation within the brain. *Firſt*, You may be aſſured of this truth, which I hold myſelf bound to prove to you by innumerable facts, that the mere depreſſion of the ſcull, much as it has occupied the thoughts of the ſurgeon, affects but very ſlightly the functions of the brain. *Secondly*, You have ſeen one, and I ſhall have occaſion to ſtate many caſes, in which the moſt profuſe extravaſations of blood have not produced torpor or coma. If, by either of theſe cauſes, the brain ſuffers, the worſt ſymptoms are ſtupor, and a ſlow pulſe; theſe injuries are local; they are merely oppreſſions to which the variable ſtate of the circulation within the brain accommodates itſelf; ſome blood is diſlodged by ſuch outward preſſure, and leſs is propelled into the head, and the moment the preſſure is removed, the function is reſtored. But, *thirdly*, Theſe cauſes are external merely; though they oppreſs in ſome degree, they do not injure the organ. If the patient lies inſenſible before the trepan is applied, it often happens, that as ſoon as the blood is let out, or the bone raiſed, he opens his eyes, mutters, and ſpeaks; knows his friends around him, and ſtirs the paralytic ſide. On the contrary, when the diſorder is within the organ,—when the extravaſation is not upon its ſurface, but within its ſubſtance,—when the arteries are in high action, its veins dilated, its cellular ſubſtance filled with ſerous or bloody exudation,—when its circulation is ſuffocated, and the whole ſtate of the organ reſembling that of a bruiſed and gorged limb,—the patient lies in that profound ſtate of oppreſſion, which is named Concuſſion, when ariſing from a ſhock, Apoplexy, when ariſing from other cauſes. The ſenſes are quite oppreſſed, the face full and diſtended, the jugulars manifeſtly dilated, the patient breathes ſlow and hard, with dilated noſtrils, and protruded lips, from which the breath is delivered in burſts, with that loud noiſe which marks what we call the ſtertorous breathing; and in no long time, the pulſe falls as low as fifty in a minute: The extremities are cold, the temples bedewed with a clammy ſweat, the bladder and rectum paralytic, ſo that the patient paſſes his fæces and urine unconſciouſly before he dies. From local cauſes of oppreſſion the brain may eſcape, becauſe of its variable ſtate of fulneſs: but, its own diſordered circulation acts irreſiſtibly on each particle of the organ, and the ſlighteſt oppreſſion of this kind is more fatal to its ſtructure, than the greateſt apparent injury. The ſenſibility and other properties of the organ are ſubjects of inquiry far leſs intereſting to the practitioner, than the ſtate of circulation within the brain itſelf.

OF THE CIRCULATION WITHIN THE BRAIN.

WHATEVER are the powers or properties of the brain, that influence, and theſe properties, are maintained in a peculiar manner by the circulating blood: —by a well-regulated ſtate of the circulation the function of the brain is ſupported, by an increaſed circulation it is excited, but as ſoon as the veins of the brain are no longer capable of tranſmitting freely the blood brought by ſuch high arterial action, the circulation is ſuffocated, and the brain oppreſſed: Surely, when the ſenſibility of the body, the power of the muſcles, the activity of the ſenſes, and the operations of the mind, are ſuſpended, we are entitled to ſay, the brain, the ſource of feeling and motion, is oppreſſed. We reckon not upon the form of the parts, as contributing to particular faculties; nor do we affect to underſtand in what peculiar conformation of the nervous matter its peculiar properties reſide, but affirm, from palpable facts, that the ſimple properties of the brain eſſentially depend on the circulation within the organ, and vary as it varies; ſo that we do not run, nor ſtoop, nor laugh, nor cough, without feeling a change and confuſion in our ſenſations. The brain incloſed within the firm unyielding bone, is not like the other parts of the body, whoſe exceſſive circulation can be more eaſily ſuffered, becauſe the parts can dilate: The brain is not a gland whoſe more liberal ſecretion may give relief to its excited circulation: The brain is not an organ deſtined to one particular function, whoſe intenſity of action may increaſe, or intermit; but one deſtined to reign over all the other functions, to regulate the ſenſes, to ſupport the ſenſibility, to guide the actions, to maintain the life of the body, and its connection with the mind: Its ſlighteſt variation is attended with unuſual diſorder, its momentary intermiſſion with inſtant death; and as its circulation becomes intenſe, or ſubſides below the due ſtandard, the main ſpring of the human frame is ſtretched ro relaxed: ſurely we may be thus allowed to uſe the language of metaphor, when the plain language of philoſophy fails to expreſs the little we know.

But that which nature has concealed, is leſs truly uſeful; that which ſhe has revealed, is really important. The continual dependence of the brain on its circulation, and the peculiar mechaniſm by which that circulation is conducted, is every way worthy of your notice. This is an inquiry fatal, as juſtly it ſhould be, to many popular theories; for the theory which does not bear an inquiry into the ſtructure of

the part concerned, which is not founded on it, does not acquire from it ſtability, ſtrength, and ornament, is one, in which we ſhould have no faith. Whether we deſcribe the parts ſimply, and ſay it is thus that the arteries of the brain inoſculate; thus are its veins conſtituted: or affirm from experience, that ſuch arteries, and ſuch veins, act more violently, are gorged more eaſily, pour out their contents into the cellular ſubſtance more frequently, or burſt from ſlighter cauſes than thoſe of other organs, ſtill our inquiry is about facts.

OF THE ARTERIES OF THE BRAIN, AND OF ARTERIAL ACTION.

THE arteries of the brain are eſtimated, by the moſt ſkilful diſſectors, to convey into this organ a great proportion of the whole maſs of circulating blood: That proportion is eſtimated, even when under-rated, at a ſixth of the whole. The two carotid arteries of great ſize, and the two vertebrals little inferior to them in diameter, go to ſupply the brain; and their diameters being compared with theſe of like giving off, deſtined for other parts of the body, are eſtimated by ſome * as conveying to this organ one third, and by all, as carrying a very great proportion of the blood. "Arteriæ capitis tertiam partem ſanguinis in corpore humano circulantis accipiunt †." Theſe four great arteries inoſculate with each other, ſo as not only to enſure, but to enforce the circulation; not only can the blood, interrupted in one direction, run on to all parts of the organ by other channels; not only is the preſſure, when intermitted in one point, ſupported from every other, ſo that there can be no receding of the blood; but as the preſſure of an injected fluid is uniform and equal in all directions, the force of all the four arterial trunks is concentrated upon every ſingle point, and preſſes the blood onwards to the extremities of the arteries. This maſs of circulating blood is poured through an organ, which, by being incloſed in a firm caſe of bone, cannot yield; and thence every unuſual impulſe of blood is directed onwards to the extremities of the veſſels by a force, from which there is no eſcape: and provident nature has divided theſe arteries into exquiſitely ſmall branches upon the pia mater, that by entering only in the moſt ſlender ra-

* Malphighi.

† Walther de Apoplex. § 49.

mifications, their occaſional excited ſtate might leſs endanger the very delicate ſubſtance of the brain.

The arterial ſyſtem belonging to this exquiſite organ, is peculiarly irritable; like the arteries of the Cheek, the Penis, the Eye, thoſe of the brain are in an inſtant, and as it were electrically excited, even by a thought flaſhing acroſs the mind; and this irritable part of the circulating ſyſtem is driven on at once to violent action, by every mental, and by every bodily ſtimulus. Paſſions and emotions of the mind are the peculiar ſtimuli of this organ: upon the ſlighteſt of theſe, the cheeks fluſh, the eyes ſparkle, the temples beat violently, the face is bloated, and the head ſeems filled with blood: the firſt ſenſations are confuſed, and we feel diſtinctly the pulſes of the brain: by oppoſition, by increaſing emotion and contention, by bodily action, or paſſionate altercation, excitement riſes to fury. The aſſuming even the outward action and aſpect of paſſion, operates as a phyſical cauſe; and our immortal poet repreſents Henry as animating thus the courage of his ſoldiers:

> « Then, imitate the action of the tyger;
> Stiffen the ſinews, ſummon up the blood;
> Diſguiſe fair nature with hard-favoured rage:
> Then, lend the eye a terrible aſpect;
> Let it pry through the portage of the head;
> Now ſet the teeth, and ſtretch the noſtril wide;
> Hold faſt the breath, and bend up every ſpirit
> To his full height."

The grinding of the teeth, foaming of the mouth, the redneſs of the eye, the inflation of the whole viſage; the ſtraining of the limbs, the ſuppreſſion of the breath, the diſtortion of the features, ſhow that paſſion is a ſhorter madneſs, accompanied as it ever muſt be, (according to the mechaniſm of this organ), with an excited circulation of the brain.

The circulation of the brain ſeems to be ſuſceptible of peculiar ſtimuli, beſides the paſſions. The excitements of opium and of wine, ſeem in a particular manner to quicken its circulation. Theſe do not, like ſpices, warm the ſtomach only; like cathartics, irritate the alimentary canal; like diuretics, excite the kidney; like diaphoretics, ſtimulate the ſkin; like mercury, prompt the ſalivary glands to an increaſed

ſecretion;—they affect the brain chiefly, or if they excite the body, it is through the brain: There is a circumſtance which gives a complexion or colour to this excitement, correſponding with certain peculiarities of the exciting cauſe, the direct *excitement* to the brain is accompanied with *ſenſations* by which it is modified. The pulſes of the brain, and its general function, are excited, and its ſuſceptibility increaſed, by the ſtimulus of wine; while that excitement is mingled with thoſe ſenſations with which the ſenſible nerves of the ſtomach are impreſſed, grateful, or unpleaſant, according to the beverage; hence the paſſions which ſuch ſtimuli inſpire, are modified by concomitant impreſſions; and as light, or noiſe, or heat, or hunger, or fulneſs, modify our dreams, when we are excited to dream; ſo is drunkenneſs modified by the various impreſſions conveyed to the ſtomach by Wine, by Opium, by Ale, by Bang, by Cava, by Arac, or other intoxicating draughts. Not only is the brain itſelf very ſuddenly excited by every increaſed impetus of blood into the head, but the organs of ſenſe ſeated there are alſo affected; the delicate organs of ſight and hearing partake of the excitement, ſo that while we feel painfully every pulſe of the arteries of the head, the ſenſes of viſion and hearing are ſo diſordered, as to increaſe the confuſion, and warn us of our danger.

The arteries of the brain have, beſides this peculiar irritability, been alledged by anatomiſts to have another ſtriking peculiarity: they cannot, after entering into the brain, have the ſame looſe and flocculent coat of cellular ſubſtance, that accompanies thoſe arteries which paſs along the bending of the limbs: the carotids and vertebrals ſeem thinner and more limber in the coats, than the other arteries; and thence they have been ſaid by anatomiſts to lay aſide, before entering the brain, their external coat, and become as delicate as veins *. This, I believe, is not ſo much a matter of obſervation, as of inference; and I mention this general opinion, only as a proof, that either from the delicacy of theſe arteries, from the ſoftneſs of the organ, or from the violent impulſe of blood with which they are often aſſailed, they are peculiarly apt to burſt, and pour out their blood.

Thus is the circulation of the brain quickened by wine, opium, paſſions, emotions, and exerciſe; and its function ſupported in a ſalutary degree, or excited to

* "Arteriæ tum quod maximum, hæ arteriæ, poſtquam ſubierunt cranium, depoſita exteriori tendinea, potiſſimo motus ſyſtallici inſtrumento, tunica, tenuiores longe ſunt, quam in reliquo corpore, et quaſi venas referunt."—*Hoffman.*

exceſs, according to the ſtate of the circulation. But every arterial action tends to venous congeſtion, and that which firſt excited, ſoon begins to oppreſs the function. Whether excited by the fury of paſſion, or the intoxication of wine, or the poiſon of opium, the perſon frequently, at the criſis of this increaſed action, falls down oppreſſed, apoplectic from paſſion, or dead-drunk from intoxication; and if he dies, you find a congeſtion of blood in all the venous veſſels of the brain. This veinous or ſecond ſtage of vaſcular congeſtion, belongs to a part of the vaſcular ſyſtem of the head, not yet explained, to the veins.

OF THE VEINS AND SINUSES OF THE BRAIN, AND OF VENOUS CONGESTION.

The blood returned from the general ſurfaces of the brain, from the ſurfaces of the two hemiſpheres, and from the ſurface of the cerebellum, is conveyed by veins which gather upon the pia mater, and run along it in branches gradually enlarging as they approach the ſinuſes. When firſt the ſcull-cap is taken off, and the dura mater raiſed, the veins are ſeen variouſly diſtended, according to the age of the patient, and the manner of his death. They ariſe by many ſmaller branches, coming from within the ſubſtance of the brain, gather into trunks, eight or ten in number, on each ſide, and from the lower parts of the brain; they riſe over the ſides of the hemiſphere, grow larger as they advance towards the ſinus; they are ſomewhat tortuous, are manifeſtly very delicate in their coats, and enter into the ſinus, or great longitudinal canal, not at right angles, but by turning forwards, and opening into its cavity, in a direction oppoſite in ſome degree to the courſe of the blood. From the ſurfaces of the ventricles, veins equally conſpicuous, are ſeen gathering into larger branches, even within the ſubſtance of the brain: In the floor of each ventricle, ſuch a vein may be ſeen livid through the pellucid ſubſtance of the brain, courſing backwards to join the other veins of the ſurface, which being united into one congeries of tortuous veſſels, form what is named the Plexus Choroides. The veins of the plexus choroides open into the vena magna Galeni; and the vena magna Galeni runs directly backwards into that great central cavity, where the longitudinal ſinus forks into the two lateral ſinuſes.

The Sinuſes of the brain are a very peculiar and provident ſtructure, indiſpen-

ſably required for defending the veins from dilatation, and for operating as ſyphons for exhauſting the veins: the ſinuſes do not merely receive, but extract the blood of the veins. By deſcribing the longitudinal, the lateral, the tranſverſe, and other leſſer ſinuſes, I ſhould only repeat what you know, and rather divert your attention from that general view of the circulation, with which I wiſh to impreſs you, and from the very ſingular effects of this proviſion of nature. Conceive only, that the dura mater adheres more firmly to the ſcull, along the lines of the ſagittal and lambdoidal ſutures, along the corners of the temporal and the wings of the ſphenoidal bone, and to all the irregular prominences of the baſis of the ſcull: conceive nature to have laid all along the ſagittal and lambdoidal ſutures, large veſſels betwixt the ſcull and dura mater, at the place of this ſtrong adheſion; and to have made all the baſis of the ſcull cellular, by interpoſing leſſer reſervoirs for blood, betwixt the outer ſurface of the dura mater, and every irregular point of bone. Imagine each of the cellular ſinuſes in the baſis of the ſcull, and the long ſinuſes under the ſagittal and lambdoidal ſutures, to communicate freely with each other, to receive veins from all parts of the brain and cerebellum, and to convey their blood into the jugulars; and you have ſome conception of the very peculiar mechaniſm, but not of the very peculiar uſes, of this vaſcular ſyſtem, ſo unlike that of any other part of the body.

The effects, or ſome at leaſt of the effects, of theſe ſingular cavities, cells, and ſinuſes, in regulating the circulation of the brain, may be thus enumerated. *Firſt*, The veins of the brain have no valves, for the motion of their blood is neither hindered nor promoted by interrupted impulſes, like that of other veins, which ſuffer preſſure from the muſcular contractions of the limbs. *Secondly*, Theſe veins, as they are little ſubject to occaſional impulſe of blood; as all the cauſes of dilatation operate upon them very ſlowly as they are occaſionally turged with their own blood, (the blood of direct circulation), but never acted upon by regurgitating blood, by blood flowing backwards from trunks, have thin and delicate coats. Were theſe veins leſs delicate, they could not ſo well correſpond with the delicate ſubſtance of the brain: were they as liable as thoſe of the limbs to dilatation, the ſubſtance of the brain would be diſordered: they are protected from the regurgitating blood, by the interpoſition of the ſinuſes, which ſerve other uſes, which I am next to explain. *Thirdly*, The ſinuſes are not veins; not veſſels having the ſame coats, and the ſame uſes, as veins, and differing merely in being of a triangular ſhape, or of being incloſed in the angles and proceſſes of the dura mater, and betwixt that membrane and the ſcull: They are peculiar cavities interpoſed be-

twixt the branches of the veins iſſuing from the brain, and the great jugular veins, which are their proper trunks: they are not reſervoirs for receiving the blood, for, as they are incapable of dilatation, they can receive no ſurplus: being once filled, they could, as reſervoirs, be no longer of uſe, and blood lodged in ſuch reſervoirs, out of the courſe of circulation, and ſubject to chemical changes, might prove hurtful. The ſinuſes are rigid canals, generally of a triangular ſhape, unalterable in their forms, incapable of dilatation, and equally incapable of contraction; they are as merely cells, as if they were formed, not under the rigid dura mater, but within the firm lamellæ of the bone: reflect on this, and you will foreſee the remarkable uſes of ſuch cells being interpoſed. Firſt, When the blood of the deſcending cava, and of the juguar veins, is by any unuſual act of reſpiration interrupted, that force, that preſſure of regurgitating blood, which would fall upon the branches of the veins within the brain, is reſiſted and broken by theſe rigid canals: in them, as there can be no dilatation, there can be no unuſual fulneſs: when in the ſinuſes the motion of the blood is interrupted, the veins become more turgid; but it is only by being unable to diſcharge their blood, while they are continuing to receive blood from behind, not in conſequence of regurgitation. Secondly, The ſinuſes, being rigid canals, ſuffer no lateral preſſure from the external air, nor from ſurrounding parts; when their blood flows out of them, their coats cannot collapſe; for every drop of blood that runs down into the jugulars, a proportioned demand muſt be made, by the emptying ſinuſes on the leſſer veins within the brain. The ſinuſes, then, are a ſort of ſyphons, by which a perpetual ſuction is maintained from all the venous branches which enter into them; and while other veins are ſubject to dilatation, and have their blood moved by impulſion, from the preſſure of ſurrounding muſcles, the veins of the brain are guarded from dilatation, have their blood impelled only by the force of their arteries, and are emptied by a peculiar mechaniſm.

By every thing curious and delicate in the ſtructure of our body, we are warned of its being formed for but a limited term of exiſtence; and wherever nature is particularly provident, we are reminded of ſome latent danger: by theſe proviſions againſt dilatation of veins belonging to the delicate organization of the brain, danger is plainly intimated; from ſudden or violent dilatation, ſo entirely inconſiſtent with its functions, the brain is thus curiouſly preſerved; but from other cauſes operating ſlowly, affecting this organ at each act of reſpiration, aggravated by every ſlight irregularity, increaſing perpetually as we advance in life, there is no proviſion of nature. It was deſtined that the body ſhould have its periods of growth, perfection, and decline,

and perhaps it is by the derangement of no one organ that the feebleneſs of the body is ſo particularly occaſioned, and ſenſibly perceived, as by that of the common ſenſorium: from the gradual injury of the brain, from dilatation of its veins, and increaſe of its natural exudations, there ariſe a proportioned debility of the general frame, obtuſeneſs of the ſenſes, imperfection of the memory, and weakneſs of all the faculties.

When, from fracture or trepan, the brain is expoſed to view, we perceive it ſenſibly affected by each arterial pulſation, and it is alſo heaved up by each reſpiration. The act of inſpiration interrupts the entrance of the blood into the thorax; the veins of the neck ſwell; the blood of the ſinuſes becomes ſtationary; the leſſer veins cannot deliver their blood, and are alternately turgid, and emptied; and this alternate turgeſcence and flatneſs muſt be felt through all the ſubſtance of the brain. The arteries of the brain operate on their correſponding veins, as other arteries operate on their veins in all parts of the body; each pulſe of the heart has its ſlight effect, and each inordinate reſpiration, as in ſtooping, running, wreſtling, cough, or aſthma; all efforts of ſtrength, all interruptions of reſpiration from diſeaſe, operate upon the head. The veins thus forced by occaſional exertions; and by chronic diſeaſes, gradually change their form; as they dilate, they become more tortuous, and that angle by which they enter the ſinuſes becomes more and more unfavourable towards the decline of life. The veins of the brain cannot be forced and dilated by regurgitating blood, but they are affected by the impulſes of their correſponding arteries, and filled more or leſs tenſely with blood, which is delivered in a proportion correſponding with the actions of the arterial ſyſtem. When the blood of the jugular veins is interrupted, and that of the ſinuſes ſtationary, the veins can no longer deliver their contents; every moment they are prevented from delivering their blood, their angle is increaſing; every time they are thus dilated by paſſion, emotion, aſthmatic paroxyſms, running, wreſtling, diving, the angle ſtill increaſes. The deliverance of theſe veins having become once habitually difficult, the head habitually full, and oppreſſed with blood, and the apoplectic prediſpoſition formed; if with theſe cauſes, (or without them, for it is more powerful than them all), the perſon lives a diſſolute life, "every immoderate cup is unbleſſed," every fit of intoxication is a ſtrain upon this ſyſtem of veſſels; each exceſs in wine gives that excitement, to which the veſſels of the brain are peculiarly ſubject; each paroxyſm of arterial action is accompanied with its degree of venous dilation: Hence the watery exudations of the cavities and ſurfaces of the brain is augmented, the diameter of its veins enlarged, the

cavities of the ventricles dilated, while the maſs of circulating blood is ſtill accumulating at the expence of the proper ſubſtance of the brain. If drunkenneſs thus affects the circulation, and the intimate ſtructure of the brain, it cannot be a matter of ſurpriſe, that in the drunkard all the faculties are affected, the memory ruined, the ſenſibility of the general ſyſtem impaired, the limbs ſhrunk, the body cold, the hands palſied, the ſtomach debilitated, the circulation torpid, the ſecretions diminiſhed, and the infatuated creature but half alive, except in the very acme of freſh excitement. Should we wonder, if, where the angle formed by each dilated vein locks it, and acts as a valve, preventing the blood being freely delivered, while increaſed arterial action puſhes on the blood from behind, the ſtate of congeſtion ſhould, upon the occaſion of any great exceſs, riſe ſuddenly to a ſtate of complete apoplexy? Should we wonder, if a perſon thus prediſpoſed, the circulation of whoſe brain is thus deranged, drop down in the moment of riotous indulgence, in the midſt of a feaſt, inſenſible and apoplectic, from the whole being oppreſſed, or paralytic, becauſe ſome veſſel has given way? Should we ſeek, by myſtical terms of exhauſted excitability, of debility direct or indirect, to explain that enervated ſtate of the body, which is ſo plainly cauſed by a ruined ſtate of that organ, which reigns over the ſenſes, the ſenſibility, the muſcular power, and, indeed, over all the functions.

Our ſyſtem is a machine, ſuch as an Almighty Creator would form, animated by an immortal ſpirit, but living, acting, and feeling by phyſical laws: and we cannot contemplate this mechaniſm, this circulating ſyſtem, by which the ſubtile powers of the mind are influenced, without thoſe fears and forebodings, which ſeem to have occupied the meditations of thoſe who have the moſt entirely reſigned themſelves to this department of ſtudy. It is not poſſible to be involved in ſuch practice, and ſuch ſtudies: to read through all the authors who have written on thoſe melancholy ſubjects of Apoplexy, Epilepſy, Palſy: to think of loſing our memory, judgement, and feeling, and yet to remain alive, without horror. "Per multos annos, (ſays Walther), hanc rem in animo volutavi, neſcioque an hoc ſit objectum mere mihi amicum, vel præſagium, apoplexia me etiam aliquando moriturum; ultimam attamen fere credo."

There occurs here a collateral ſubject, which, if I were not to mention, I ſhould at once do you and myſelf an injuſtice, leaving you in doubt concerning my opinion on a great and prevailing doctrine, or rather in regard to the relation of that doctrine to our preſent ſubject. Nothing can be imagined more falſe or unphiloſophical, than the common belief, that there are ſuch modifications of nervous ener-

gies, as conſtitute diſeaſes independent of phyſical cauſes, or diſtinct from any affection of the brain; nothing more diſcouraging, ſince it puts an end to all inquiry. The doctrine which has for many years prevailed over all former theories, is a ſplendid effuſion of genius, but by no means conſiſtent with facts, not true, not uſeful, nay, it is very hurtful. Debility is not the cauſe of the ſlighteſt nervous diſeaſe; debility, wherever it exiſts, muſt be a temporary ſtate, owing, if the doctrine I alluded to be true, to a ſuſpenſion of the uſual powers of life. Debility, or ſuſpended action, from ſuſpenſion of the exciting powers, is, according to that moſt ingenious theory, but too eaſily removed; for excitability being accumulated, the ſyſtem is too ſuſceptible to the renewed application of exciting powers: Debility produced by want of food, want of light, want of exerciſe, want of air, want of inſpiring paſſions, as hope and joy, the privation of all the ſupporting ſtimuli of life, may blanch the cheek, and emaciate the body, depreſs the ſpirits, and give a heavy and dolorous diſpoſition of mind, but ſtill does not conſtitute diſeaſe. This is miſery and grief, it is merely debility, for it can be removed, but not diſeaſe, which takes place only when ſuch cauſes have, by ſome organic change, affected ſome material part of the ſyſtem. Debility, then, is properly ſuch feebleneſs as proceeds from want of excitement; diſeaſe, ſuch want of action as proceeds from loſs of ſuſceptibility; and loſs of ſuſceptibility flows ſlowly from ſome change of organization. Trace back all nervous diſeaſes to their ſource, and you will find they have a reference to the ſtate of the brain; Apoplexy, Idiotiſm, Palſy, Epilepſy, are not diſeaſes of debility, though inſcribed ſo in the Brunonian ſcale; our ſenſes are all deceived, if theſe be not diſeaſes of altered organization, proceeding from cauſes much the reverſe of weakneſs. That all the functions are debilitated when the intellect is weakened, the ſtomach diſordered, half the body palſied, or the patient trailing his lower extremities, like a wounded ſnake upon the ground, is true; but that debility, from want of ſtimuli, or exhauſted excitability, that weakneſs, direct or indirect, is ever the cauſe of ſuch diſeaſe, is ſo far from true, that diſeaſe does not exiſt, till there is a fatal and irrecoverable change in the ſtructure of the brain; and often, I fear, that excited ſtate, which is deſtroying the organ, and which is ſuppoſed to end in indirect debility, but which truly ends in injury to the ſtructure of the part, is urged on to its fatal termination, by exciting powers, by emetics, opiates, hartſhorn, bliſters, and wine. It is not eaſy to know, when that arterial action has ceaſed, which endangers the organ; it comes, as I ſhall preſently prove to you, in repeated intermitting paroxyſms; and I ſhall teach you, by the plaineſt

practical inferences, to be careful not to impel that blood into the head, which ſo often oppreſſes the brain by the fulneſs of the veſſels, or ruins its ſtructure by forcing them till they give way.

The ſubtilty and ingenuity of that doctrine, which ſuppoſes an excitability univerſally diffuſed inherent in the whole, diſtinct from the office of the brain, independent on vaſcular action, and which may be depreſſed or raiſed, according to the gradations of the exciting power, is indeed admirable: but, it might have been the invention of a metaphyſician, as well as the ſpeculation of one really acquainted with the ſtructure and living powers of the animal body *: It has introduced dangerous innovations into practice, and taught young and inexperienced men to regard, as diſeaſes of exhauſted excitability, thoſe very affections, which plainly and manifeſtly depend on a change in the organ, a ſudden and viſible change. What is gangrene? a Brunonian muſt reply, It is exhauſted excitability: the common ſtimuli, he affirms, have been ſo injudiciouſly uſed, that a high excitement and exceſſive action have taken place, which continues unremittingly, till the excitability of the part being exhauſted, its veſſels are no longer able to act, and thence it dies: or, the uſual ſtimuli have been ſo entirely withdrawn, heat, for example, has been ſo long abſtracted, that the excitability has accumulated till even the uſual degree of heat will have unuſual effects on the ſenſibility of the parts; and in this ſtate of accumulated excitability, the patient being imprudently allowed to approach the fire, or received into a heated room, the accumulated excitability is kindled at once into extreme action, is ſoon exhauſted, and being exhauſted, the veſſels ceaſe to act, the part dies.

To a ſpeculative phyſician, a theory ſo ſimple, ſo philoſophical, correſponding too, in ſome great points, with other laws of the animal body, muſt be pleaſing; but to the practical ſurgeon, it muſt be little ſatisfactory, oppoſite as it is to all theſe obſervations which he has daily occaſion to make: He knows, that when the action of the veſſels ceaſes, and a part of the body dies, ſuch veſſels are firſt ſuffocated, and finally oppreſſed by effuſion of blood or ſerum into the cellular ſubſtance A part, in

* With what ill ſucceſs a phyſician abandons his profeſſional inquiries, neglects the ſtudy of the ſtructure of the animal body, and ſeeks, "by metaphyſic aid," to account for all its movements, my reader will feel very forcibly, upon reading an admirable and eloquent refutation of the Darwinian theories, by Dr Brown of this city.

paſſing through the various ſtages of vaſcular action, undergoes various changes, which are almoſt enumerated in the definition of inflammation, viz. pain, tumor, and redneſs of the part, terminating often in ſuppuration, or gangrene: Vaſcular action, ſlightly excited, and regularly ſupported, not violent in degree, not inconſiſtent with the proceſs of nutrition, cauſes the part to grow, and forms a ſolid tumor: Action more violent, increaſing the ſenſibility, and affecting in ſome degree the ſtructure of the part, creates pain, ſwelling, and redneſs: But ſuch ſwelling does conſiſt of blood ſtill contained within its veſſels; it conſiſts of effuſion, chiefly of ſerum ſo injected into the cellular ſubſtance of the part, that it bears the impreſſion of the finger, and is abſorbed when the vaſcular action ceaſes. But when the action of a part is excited to its utmoſt degree, the veins are no longer capable of tranſmitting the blood impelled into them by the high action of the arteries; the cellular ſubſtance is diſtended, not with ſerum, but with blood; the ſwelling becomes peculiarly firm; its ſurface has a livid tinge, from the bloody extravaſation; the ſtructure of the part gives way under ſuch intenſe action; and the whole limb being injected with blood, its veins dilated and reſiſting, its cellular ſubſtance crammed, the ſkin diſtended to its utmoſt pitch, the arteries are at laſt oppreſſed, and ceaſe to act, and thus the part dies. Why is eryſipelas ſo apt to ſlough? Becauſe that deep complexion which characteriſes the diſeaſe, implies this injection of blood into its cellular ſubſtance. Why does a much bruiſed limb fall into gangrene? Becauſe, its veſſels being burſt, every arterial pulſe injects blood into its cellular ſubſtance. Why does a carbuncle fall into gangrene, but becauſe its character of intenſe redneſs, and bloody effuſion, is marked from the firſt moment of its formation? Why, when the ſurgeon makes an early inciſion, in a caſe of very high and dangerous inflammation, with the hopes of ſaving a joint, or of preventing the affection of ſome of the great cavities, does he find always, not pus, but pure blood? Becauſe, inflammation, requiring ſuch a doubtful meaſure, is ſo violent as to break at once the ſtructure of the part, and produce, even in an early ſtage, an effuſion of blood. What means the old and approved practice of ſcarifying the limb that is in danger of gangrene, but cutting the bark to allow the trunk to ſwell? On many occaſions, I have anticipated fatal deſtruction of ſtructure, by early opening of cellular effuſions, which always I have in ſuch caſes found crammed with blood; and often I have found blood thus effuſed, by extreme vaſcular action, into natural cavities, as well as into the leſſer cells. The Honourable Mr W. from a fall in which he bruiſed the head of the tibia, but not the knee-joint, againſt an angular ſtone, by his neglecting the injury, and dancing that evening,

had, before the third day, the moſt alarming ſwelling of the knee, the moſt intenſe fever, the moſt excruciating pain that I had ever witneſſed, attended with ſuch tumor, that not only the knee, but the thigh and leg, were ſwelled to the thickneſs of his body. I found, in various points, the ſenſe of fluctuation ſo diſtinct, that I reſolved to make early inciſions. Dr Monro and my Brother approved of my deſign, and agreed to ſhare the reſponſibility of ſo unuſual a proceeding. We made inciſion after inciſion, all round the knee-joint; evacuated, from each ſoft and ſaculated part of the limb, and eſpecially from the burſæ, great effuſions of pure blood, which coagulated in the cups; each evacuation put an end to a paroxyſm of fever; each cavity ſuppurated ſlowly; and by ſucceſſive inciſions, careful evacuations of the matter, and the uſe of tents, the limb was preſerved, the joint anchyloſed, and a young gentleman of uncommon talents, and of literary attainments far beyond his years, was providentially ſaved.

What, then, are the diſeaſes of the brain? what are the analogies betwixt its inflammation, and that of muſcular parts? Its diſeaſes are not thoſe of exhauſted excitability! of ſtimuli applied till they loſe their effect! but of diſordered circulation, and injured organization. Not a fit of intoxication, nor paroxyſm of paſſion, but has its effect on the intimate ſtructure of the brain; moſt naturally might we ſuppoſe that an organ ſo delicate could not ſuſtain ſuch violence of circulation, that its function muſt be aboliſhed, and the whole ſyſtem fatally affected, before any excitement could produce in its parts a ſenſible change; but, the univerſal influence of the brain on the animal ſyſtem only makes its ſlighteſt affections conſpicuous; and its delicacy, and the curious forms of its cavities and prominencies, makes the ſlighteſt change of ſtructure viſible. By the violence of excited circulation, the veins of the brain become tortuous and dilated; the bloody points, denoting the calibre of its veins and arteries, become conſpicuous in every ſection of its medullary ſubſtance; they are both more frequent in every diſeaſed ſtate of the brain, and they are augmented in ſize. The cavities are dilated; the watery exudations increaſed; the plexus choroides diſtended with blood; the parts, as the horns of the ventricles, the pedes hyppocampi, and other forms on the internal ſurface of the brain, are neceſſarily enlarged: upon firſt raiſing the ſcull-cap, the brain ſeems to burſt from its confinement, ſo generally turgid is it with blood; and often ſpots of ecchymoſis, or univerſal ſuffuſions of blood, ſometimes on its ſurface only, ſometimes throughout its ſubſtance, ſhew the violence it has ſuffered, from a too rapid circulation. Theſe are a-

mong the phenomena of every diſſection, and the confuſed enumeration of theſe various diſorders has thrown an air of uncertainty over every pathological concluſion, and made the volumes of Bonetus and Morgagni ſeem a chaos of inexplicable and diſcordant facts. But I believe I ſhall be able, by one ſlight narrative and general diſſection, to explain to you the importance, the certainty of ſuch ſtudies, and the harmony betwixt what we ſee our patient ſuffer, and the changes which diſſection diſplays.

A much valued friend of mine, after long continued ill health, died a moſt afflicting death. He died of the diſorder of the head, which is ſo often and ſo fatally aſcribed to the ſtomach. The ſtomach never affects the head: By what mechaniſm, or by what nervous ſympathy, could the ſtomach materially affect the head? It is generally a diſorder of the brain itſelf that affects the ſtomach with ſickneſs, the ſenſes with confuſion, the limbs with debility, the heart with palpitation, the whole frame with tremors: the indeſcribable and complicated ſenſations which we cruelly call nervous, as if they proceeded from a diſordered and ill-regulated imagination, are real and phyſical affections of the moſt important organ of the body. When at any time the ſtomach performs its functions imperfectly, and acidities are generated, digeſtion is imperfect, and the whole body is debilitated, but no hypochondriaciſm belongs to this form of ſtomach-diſorder; it does not affect the head. When the ſtomach itſelf falls into organic diſeaſe; when every morſel is rejected with violent retching, and even the blandeſt fluids excite ſickneſs and pain; when the body is emaciated, and the ſcene of ſuffeing laſts for months; the patient never vomits but when he attempts to take food, and dies merely of inanition; he feels only a ſickly languor and ſwooning, and dies without pain, preſerves his intellect to the laſt hour, and is free from every other diſorder, and every other pain, to the moment of his death. But the ſlighteſt blow on the head, the ſlighteſt variety of motion in ſailing, or in a carriage, the ſlighteſt concuſſion, the ſlighteſt effuſion of blood, the ſlighteſt inflammation of the brain, whatever oppreſſes its ſubſtance, or perturbs the circulation much or little, produces ſickneſs; and that ſick headach, to which my friend's malady was nearly allied, is cauſed always by a temporary congeſtion oppreſſing the brain.

In my friend, the ſtate of ſuffering was long and diſmal; the firſt ſymptoms were headach, complaints of the ſtomach, and frequent delirium; the height of his diſorder was delirium, with inceſſant ſickneſs; in the concluſion his ſenſes returned; he called for help, and knew his friends only after the bladder and viſcera

had become paralytic, a preſage of approaching death. He was for ſome years ſubject to this very peculiar train of ſymptoms, and each paroxyſm followed nearly the ſame courſe; firſt his general complaints had all the characteriſtics of hypochondriaciſm, as dull and oppreſſive headachs, ſtomach-complaints, and variable ſpirits, ſometimes lively, generally gloomy: After a period in which he felt a ſenſe of oppreſſion within the head, as if from congeſtion, there came on all the ſigns of high action, a ſmart fever, and ſudden delirium, followed by a ſlow recovery, and great weakneſs. His confuſion of head and delirium were often ſlight, and were ſo frequent, as to have become familiar to his friends; nor did they leave even a ſtrong impreſſion on his own mind, but were often a ſubject of pleaſantry. His paroxyſms began with pain and confuſion; then ſucceeded inceſſant vomiting, like that of a perſon who has a concuſſion of the brain, with a torpor of the bowels, which ſeemed to continue long after each paroxyſm, in ſome degree paralyſed; then followed ſlight raving, and mild delirium; and his recovery was ſlower and leſs perfect at each return. After a ſummer-ſeaſon paſſed in making tours, and at watering-places, he returned in good ſpirits, and began, in tolerable health, that winter which was to be his laſt. Eructations, indigeſtions, headachs, and gloomy thoughts, preceded as uſual the fatal paroxyſm. His ſtomach unfortunately, and not his head, was attended to by thoſe ignorant people to whom he intruſted (what is regarded but too often as trivial) the general regulation of his health. Stimulants and tonics of every kind were adminiſtered; at laſt the fit of delirium attacked him, while ſitting by the fire in a quiet domeſtic circle; he raved fooliſhly and ſillily; he was put to bed; the fury of the delirium increaſed, and he ſtruggled in this condition for nearly three weeks: the pains in his head ſeemed to diſtract him; the vomiting was inceſſant; at laſt the venous congeſtion, and ſerous effuſion, having taken place of the increaſed action, he fell low, regained his intellect, and recogniſed his friends; for eight days, the ſhrieking from pain, and the ſtruggling from inſanity, had ceaſed; the functions ran low, the pulſe became feeble, the extremities cold, and the bladder and bowels paralytic, ſo that we were obliged to draw off the urine three times a-day. After lying a fortnight in this condition, he expired.

Upon diſſecting the abdomen, we found the bowels and bladder ſlightly inflamed, the latter, eſpecially, thickened and dilated from frequent diſtenſion. Upon opening the brain, we found at once every mark of diſorder; ſuch turgeſcence of the veins, as ſufficiently explained the hypochondriacal and ſtomach complaints, ſuch

innumerable bloody points in the ſubſtance of the brain, as evinced the highly-excited circulation which cauſed the delirious ſtate; and ſuch watery effuſion as explained the fatal palſy.

In diſſecting ſuch a brain, you will proceed thus: You firſt, after raiſing the ſcull-cap, lift the dura mater, and you ſee the whole ſyſtem of the veins running in the doublings of the pia mater, black, turgid, and tortuous, paſſing over the hemiſpheres of the brain, towards the longitudinal ſinus: You then draw out the falx, and cut into the ſubſtance, by dividing tranſverſely one of the hemiſpheres of the brain, and then you are ſtruck with finding, in place of ſmall red points, as if pricked with a pin, the veſſels within the ſubſtance of the brain ſo dilated, that their mouths almoſt appear marked with gouts of dark-coloured blood: theſe are the ſections of veins; you are ſenſible, that however active or full the arteries are before, blood after death is to be found only in the correſponding veins. You then cut a ſecond or a third layer of the brain with your knife, carrying it horizontally; and although you had no reaſon to believe you had approached the ventricle, you find that you have cut it open, becauſe it is enlarged, and part of the water flows out by which it was diſtended. You next open the cavity more widely, and find that all its parts are enlarged; that its roof is raiſed, its horns prolonged, the turnings of the Pedes Hyppocampi, and the leſſer hyppocampus enlarged, and apparently magnified; part of the ſerum ſtill occupies the cavity of the ventricle, and its walls are often ſheathed with a mucus, reſembling an inflammatory cruſt. When the ventricles are fully opened up, the choroid plexus are found remarkably enlarged, their veſſels tortuous, and turgid, and their colour darker; and the veins, where they are ſeen ſhining through the ſubſtance of the brain, on the floor of the ventricle, appear unuſually large. All the veſſels of the Velum, too, and of the Pia Mater, every where are turgid with blood. When ſuch are the phenomena, can there be the ſlighteſt reaſon to doubt, that ſucceſſive paroxyſms of vaſcular action and congeſtion of blood, have injured the ſtructure of the brain? that at each ſucceſſive impetus its veſſels have been dilated, its exudation increaſed, its cavities diſtended, its actual ſubſtance diminiſhed? and that to theſe diſorders of the organ are to be aſcribed what are called nervous affections, the depreſſion, languor, and debility, the irregularity of ſpirits, the diſorder of the ſtomach, the emaciation of the body?

I am now to cloſe this general ſketch of the pathology of the brain; and am perſuaded, that when you have conſidered, along with me, individual cauſes, and particular affections, you will return to this plain concluſion, That every leſſer af-

fection of the nervous ſyſtem, is a degree of the greateſt; that no nervous diſorder is without, not only a phyſical cauſe, (for that, though material, might eſcape our ſenſes, and be inſenſible to ſight, or touch), but viſible and tangible cauſes, which we can demonſtrate. That it is a degree of the ſame diſorder, which in palſy makes half the body powerleſs, that cauſes in hypochondriaſis all the ſyſtem to become feeble and languid, the head confuſed, the feelings capricious, and variable, and the functions of the ſtomach and viſcera to fail. Concerning the brain we know nothing ſo intereſting as this unqueſtionable fact, that the injury of its parts does not ruin individual functions; that preſſure from without, and which muſt be local, has ſlight effects, compared with that preſſure which muſt be univerſal, viz. compreſſion from within, by the overdiſtenſion of its own arteries and veins: That of all the organs of the body, the brain is that which moſt depends on the ſtate of its circulation: That under an excited circulation, while ſtill the veins can tranſmit freely the blood of the arteries, the paſſions of the mind are enlivened, the appetites inordinate, the ſtrength and muſcular efforts preternatural: That ſuch excited circulation cannot long endure without terminating in venous congeſtion, or ſerous effuſion; and thence it is that Idiotiſm ſucceeds Mania, Coma ſucceeds Delirium, Palſy follows Apoplexy, becauſe in each, by the continued excitement, or fulneſs, ruin enſues to the delicate organization of the brain; and thence theſe ſtates are incurable, which mere debility, whether direct or indirect, could not be.

We ſhall, in the courſe of our inquiries, be ſenſible how much the ſtate of this organ, and the prediſpoſition to diſeaſe, varies during the progreſs of life; for the child is liable to febrile action in the veſſels of the brain, and watery effuſions, by which the organ, and all its functions, are ruined; this is the horrible diſeaſe of hydrocephalus: The young man, living in a ſtate of high excitement, is ſubject to epilepſy, and to madneſs, both ſtates of the moſt violent vaſcular action and congeſtion: The man at the meridian of life, of forty years of age, whoſe frame is vaſcular, whoſe ſyſtem is full, whoſe paſſions are high, whoſe arterial ſyſtem acts intenſely, but whoſe venous ſyſtem within the head begins to be dilated, is ſubject to acute apoplexy, to ſudden burſting of the veſſels, followed by palſy, and to ſlow congeſtion, with increaſing diſorder of the ſtomach and nervous ſyſtem, and thoſe diſturbed ſenſations which are cruelly pronounced imaginary, though ariſing from a phyſical cauſe. The man paſſing ſixty or ſeventy years of age, has the veins dilated, a ſlow congeſtion is gradually aboliſhing his faculties, and leſſening his ſtrength;

his ſight and hearing are imperfect, his body is emaciated, his memory fails; he feels all the infirmities of old age, and is prediſpoſed to that diſeaſe, the apoplexy, which cloſes the ſcene, (if Walther is not deceived), on one fourth of the human race. Our irregular gratifications, and indulged paſſions; the ſeverities of ſtudy and ſecluſion, of thoſe who are involved in profeſſional occupations, or the variety of climate to which they are expoſed, who engage in mercantile or military purſuits; violent exerciſes, or exceſſive labours in men! and in women, the irregularities of menſtruation, (the difficulties created by this peculiar function, being ſuperadded to their circulating ſyſtem), all ſeem to me to operate on the brain, and to make this train of diſeaſes frequent.

I ſhall not limit whatever information I may be able to convey to you concerning the various ſtates of the brain, by forms, or definitions; I mean not, indeed, to define, but rather to enumerate, thoſe intereſting ſubjects of inquiry which muſt next engage our attention. It is my deſign to inquire, *firſt*, Into the APOPLECTIC STATE of the brain, where, from venous plethora, ſlowly increaſing for years, from peculiar habits of life, cauſing a gradual dilatation of the veins, from febrile and ſudden impulſe, to the head injecting its veins with blood, and its ſubſtance with bloody or ſerous exudation, the organ is oppreſſed, and its functions ſuſpended. *Secondly*, Into the PARALYTIC STATE OF THE BRAIN, where, from accumulation of blood, febrile paroxyſms, violent exertions, crowded rooms, heat, gluttony, and all ſuch cauſes as over-diſtend the blood-veſſels; from ſuch violence as makes blood-veſſels in any organ of the body, but more eſpecially in the delicate ſubſtance of the brain, give way, there is an effuſion of blood, general or partial, which, by deſtroying the ſubſtance of the brain, not only ſuſpends, but entirely ruins its functions, ſo that one ſide, or the whole body, is irrecoverably affected with palſy. *Thirdly*, The EPILEPTIC STATE, a ſtate almoſt peculiar to the young and vigorous; a ſtate in which the blood is by a ſudden impulſe, an impulſe often excited even by ſympathy and fear; an impulſe diſtinctly felt at the approach of a paroxyſm, and generally attended with a ſenſe of danger, ſo as to incline the boy to cling round ſome firm body for ſupport, accompanied too with the very peculiar ſenſation of a beam of light, flaſhing, as it were, from the eye to the brain; an impulſe which I have generally found accompanied with a peculiar pulſe, and a marked tendency to excitement in the circulating ſyſtem of the head; a ſtate of ſudden arterial excitement, ſuch as often takes place in the time of child-bed labour. That it is to an arterial impulſe ſuch diſeaſe is to be aſcribed, no practical ſurgeon will doubt, who has witneſſed the

high pulſe, turgid neck, ſwelled tongue, and bloated countenance, of thoſe boys who fall for the firſt time into an epileptic paroxyſm; nor any theoriſt who recollects one ſimple fact in the economy of this function, viz. that when one half the body is ſtruck with palſy, the other is uſually convulſed; or, in other terms, while the high action of the veſſels has in one hemiſphere of the brain produced either general or partial extravaſation, the other ſide is at that moment labouring under the continued impulſe and imperfect tranſmiſſion of the blood. *Fourth*, Of the EXCITED STATE of the BRAIN; firſt, Delirium, as in the coup de ſoleille, or in the fevers of warm climates, which terminates in ſudden death, in a degree of palſy; in loſs of memory, in long-continued ailments of the digeſtion and depreſſion of ſpirits; ſecondly, Mania, an excited ſtate, conſiſtent with the health of the body, not ſo properly deſtroying, as exciting, beyond their juſt degree, the powers of the mind, attacking in paroxyſms of excitement, and ending in idiotiſm, or confirmed imbecillity, from the ſtructure of the organ being injured; thirdly, Hydrocephalus, an inflammation of the brain almoſt peculiar to boys, in which after delirium, accompanied with ſhrieks and cries, there comes on ſtupor and convulſion, cauſed by a watery effuſion into all the cavities of the organ, diſtortion of the eyes, contortions of the limbs, palſy of the bowels, and death: Finally, Local Inflammation of the brain, ending in abſceſs and death. In what degree I may fulfil your expectations, I know not, but I ſhall employ now a part of your valuable time, in depicting to you, by obſervations, diſſections, and deſultory remarks, theſe ſeveral ſtates of the brain; relating diſtinctly and plainly what changes are found in the brain, after certain diſorders of the body; this is the ſole theory I profeſs.

SKETCH OF THE APOPLECTIC STATE OF THE BRAIN.

OF blood-veſſels are all parts of the body formed; by vaſcular action are its parts nouriſhed; by the interruption or weakneſs of vaſcular action and ſecretion does the body decay; and when the organization of a part of it is at any time deſtroyed, it is by exceſſive action of its veſſels, injecting the cellular parts with blood or ſerum, filling them with new ſecreted matter, or otherwiſe obliterating the very veſſels by which ſuch matter was ſecreted; or, by ſo compreſſing them by ſudden effuſion, as to produce gangrene. The affection of the nerves is the cauſe of the pain which accom-

panies diſeaſe; but the texture of the parts is ruined only by inordinate action of the veſſels; and by the effuſion of their fluids into its cellular texture.

Every thing in the ſtructure of the animal body, whether we reaſon on the phenomena of vaſcular action during life, or examine the coarſer parts of its texture after death, intimates to us that it is formed only for a temporary exiſtence. I have firſt examined the moſt delicate organ of our frame, whoſe ſlighteſt affections produce paralyſis of the whole body, or diſorder the intellectual powers; and have pointed out various delicacies of organization, on which, together with the fatal prediſpoſitions they create, I am now to fix your attention in a more particular manner.

The baſis of all our reaſoning is the peculiar delicacy of the organ. A complicated function, preſiding over all the others, is ſupported by a complicated and delicate ſtructure; and from the variable ſtate of the circulation in this organ, ariſe a vaſt proportion of the diſeaſes of the body, and all the moſt horrible alienations of the mind. The inordinate deſires, the infuriated paſſions, the cries, the laughter, the rapid torrent of words, the blaſphemies, and unmeaning imprecations, the demoniac-like ſtruggles, and irreſiſtible ſtrength of the madman, are the reſult of a degree of excited circulation, ſtill conſiſtent with the action of its veſſels. The deep oppreſſion of the apoplectic ſtate, the ſtupor of lethargy and coma, are the conſequences of that ſurcharge of blood, that extravaſation of ſerum, or that general effuſion into the ſubſtance of the brain, which reſults either from gradual cauſes operating ſlowly, or from ſuch violent and ſudden action of its veſſels, as the veins are unable to reſiſt without dilatation, or the ſmaller veſſels to ſuſtain without burſting. The maimed condition of the paralytic, who lifts one powerleſs hand by the help of the other, or trails his limbs along the ground, proceeds from ſudden effuſions of blood in the ſubſtance, or upon the ſurfaces of the brain. Innumerable children are cut off, and whole families made deſolate, by occaſional inflammations of the membranes terminating in watery effuſions, into the cavities of the brain, which exudation is followed by howlings, ſquinting convulſions, and death: Nor is there the ſlighteſt reaſon to doubt, that the languor, and miſerable feelings of hypochondriaciſm, the loſs of memory, the idiotiſm, the irrecoverable loſs of hearing, feeling, and muſcular power, which follow the fevers of warm climates, proceed from ſlow or ſudden changes in the healthful ſtructure of the brain, from venous congeſtion, from watery effuſions, from enlarged ventricles, and change of the intimate ſtructure of the organ, which ſeems

firſt and principally affected in theſe tropical diſeaſes. Theſe fevers begin with delirium, and, ſtrange as it muſt appear to a mere philoſophizer in medical ſcience, evacuations only can ſave the patient from diſeaſes which are eſteemed diſeaſes of debility.

The brain, firmly incloſed within the unyielding cavity of the ſcull, is deſtined to ſuffer from every ſlight variation in its circulating ſyſtem; hence its ſtate is as variable as the air, ſubject to every ſkiey influence. Its arteries are in great proportion to its bulk, and its circulation rapid, and eaſily excited, even by thought or motion, by opium or wine; its veins, though having every proviſion againſt dilatation, are yet ſubject to diſtention. Nature is indeed ſo curiouſly provident againſt diſorders in its circulating ſyſtem, as to prove, that here lies the greateſt danger to the organ. The balance betwixt its arteries and veins is ſeldom true, being ſubject to ſo many occaſional cauſes of diſorder; and this balance changes ſlowly, but continually, during the progreſs of life, with conſequences more deciſive to the healthineſs of the whole frame, than can reſult from thoſe ſimilar and concomitant changes, produced by time and uſe, in all other parts of the body. The brain is liable, from the delicacy of all its blood-veſſels, to rupture, with effuſion of blood into its cavities, or upon its ſurfaces; from the delicacy of its intimate ſtructure, to a degree of ecchymoſis, or extravaſations within its proper ſubſtance; from the extent of its cavities and ſurfaces, to watery effuſions, even from ſlight and temporary excitement; and from the extreme vaſcularity of its ſuperficial cellular ſubſtance, it is liable to effuſions of a complete ſerum, ſuch as coagulates into gelatinous maſſes. It is ſubject, alſo, like every other part, to alterations in its intimate ſtructure, by ſlow and gradual changes; as in mania, where long-continued, but moderate excitement ſeems to harden the proper ſubſtance of the brain. Fulneſs of veſſels, effuſions of ſerum, and extravaſations of blood, then, ſeem the chief accidents to which the organ is liable; and the ſlighteſt of theſe affects all thoſe parts and organs of the body, to which the brain ſerves in its healthy ſtate as a ſource of ſenſation. Other parts perform only their own appropriate functions, and are remotely connected with the whole, no farther, indeed, than to give pain when they are inflamed; to produce temporary lameneſs when their inflammation impedes the motion of a limb; or to cauſe a ſlight general diſorder when ſome needful ſecretion is prevented. But the brain relates to the whole, regulates the whole, and that exceſs of vaſcular action which cauſes only pain in a joint or increaſed ſecretion, in a gland, or ſuppreſſed diſcharge, when affecting any of the natural paſſages; that

deep inflammation, which, by extravaſation of fluids, ſuffocates the circulation of a limb, and cauſes the death of the part, produces, when it affects the brain, delirium, convulſion, or madneſs; and in its latter ſtages, in its ſtages of extravaſation, and injured ſtructure, apoplexy, palſy, and the death of the whole body.

You will perceive, that it is my deſign to put the brain and its diſeaſes on the ſame footing with other parts of the body, and their morbid affections; to aſcribe no diſorder to occult properties, but to ſome phyſical cauſe; to conſider the conſequences of vaſcular action in this organ, aſcribing the various forms its diſeaſes aſſume, to its complicated relation to the general ſyſtem. Yet, in aſcertaining any phyſical cauſe, in aſſociating ſymptoms with organic affections, there is a difficulty which it is my firſt buſineſs to explain. "The phyſician ſhould not (ſays Ballonius) be raſh in promiſing to prove by diſſection the cauſe of death in thoſe who periſh from diſeaſes within the head; for I know not how it comes to paſs, but ſo it is, that the knowledge and the cure of the diſeaſes of the brain is involved in difficulties*." "*Many die convulſed, and apoplectic, in whom no marks of diſorder, no particle of water, of blood, of ichor, is found effuſed.*" What can this mean? Is there nothing of the ſtructure injured, even where the diſeaſe has thus proved fatal? Is the diſeaſe ſeated in the head, and yet unaccompanied with any diſorder in the brain? Can ſuch affections ſubſiſt by any other than phyſical cauſes? Is it poſſible, that the patient has periſhed merely from the excitability being exhauſted? Every fact, caſe, diſſection, and inference of any kind, will prove, that he dies, becauſe by external violence, by intenſe vaſcular action, or by gradual decline of health, and venous dilation, the ſtructure of the organ has been deſtroyed.

Whence ariſes this difficulty of which Ballonius complains? From pathologiſts imagining always ſome fixed and permanent change, ſome mechanical cauſe for every diſorder; from their commemorating in morbid diſſections, only what is unnatural. Look to Arnold on Madneſs, to Chrichton on Mental Diſeaſes, to Bonetus, Valſalva, and Morgagni; and you find enumerated as cauſes of diſeaſe, indurations of the dura mater, thickening of the ſcull, oſſifications of the falx, or tentorium; obſtructions of the arteries, of the infundibulum, or of the communications betwixt the ventricles; ſabalous concretions round the pineal gland; tumors of various deſcriptions, hydatids, enlarged ventricles, ſchirrous and

* "Caveant medici prædicere, ſe deprehenſuros aliquid in capite eorum qui morbo cerebri interierunt."—Ballonius. It is Boucteſa who adds, "Neſcio qui fiat, ut morborum cerebri, et notitia, et curatio ſit difficillima." "Notitia quidem quoniam multi convulſi ſunt, apoplexia, epilepſia ſublati, in quibus fere nullum veſtigium mali aperto cranio, inventum eſt, nec ſanguis, nec aqua, nec ichor."

glandular-like tumors of the plexus, and even worms in the ſinus: In ſhort, all ſorts and ſhapes of what are called diſeaſed phenomena; all the great, and all the trivial, the old and the recent, the harmleſs and the morbid phenomena, are confounded together: The ſlight thickening, the ſlow oſſification, the recent extravaſation, the gradual changes produced in the ſtructure of the brain, all that ever was obſerved or recorded, is tumbled down before the reader in one promiſcuous heap; the author ſaying, there, theſe, or ſome of them, or all of them, are the cauſes of madneſs, while the paſſing ſtate of the circulation and vaſcular action, the real occaſion of the ſymptoms, and the true cauſe, indeed, of theſe very indurations and concretions, is utterly diſregarded.

Far from diſcovering to us the correſpondence of cauſes and ſymptoms, this proceſs of collecting inſulated facts, and giving equal importance to every accidental change, confounds all cauſes and ſymptoms, and makes the moſt diligent man turn away diſſatisfied from the beſt ſources of inſtruction: the ſtudent, raving after theories, could not find, among this promiſcuous heap, the very ſhadow of a cauſe for any ſymptom, nor ſhape out any of his air-caſtles; the ſober man of practice could not diſtinguiſh one profitable fact, nor uſeful concluſion, nor find a motive for perſevering in ſuch a ſtudy.

Far from being the cauſes, theſe, if they have any relation to any general morbid ſtate, are the mere conſequences and concomitants of diſeaſe. Theſe obſtructed arteries, oſſified membranes, and ſabalous concretions around the pineal gland, are not only conſiſtent with health, but more frequent in health, when long life has allowed time for theſe ſlow changes of ſtructure. In violent, or in long-continued diſeaſes, vaſcular action, while it is altering the healthy ſtructure of the brain, while it is dilating the ventricles, increaſing the natural ſerous effuſions, or diſtending the veins, may alſo thicken the membranes, or even the ſcull; but it is in the operation of this vaſcular action upon the proper ſubſtance of the brain, that the diſeaſe conſiſts. As well might we, in an inflamed and mortifying limb, examine the warts and calloſities with which time and accident have ſtudded its ſurface, as record in the diſeaſed brain only theſe oſſified membranes, or ſabalous concretions. What do we obſerve moſt in a diſeaſed limb? its unuſual heat; its increaſed ſenſibility, amounting to actual pain; its inflamed colour, which implies the higheſt ſtate of vaſcular action conſiſtent with free circulation; that increaſing tenſion, and that change of colour from red to purple, which implies bloody extravaſation: We obſerve, in the progreſs of the inflammation, that incipient coldneſs which implies that its blood has

ceaſed to circulate; thoſe veſicles on its ſurface which imply that its fluids are extravaſated, and no longer ſubject to the laws of the circulating ſyſtem; that increaſing dryneſs and cruſt-like hardneſs of the ſkin, which marks the laſt ſtage of ſphacelus, when the limb is utterly dead.

In the brain, the phenomena of vaſcular action can be no other than in a limb; the peculiarities of ſtricture give ſome variety of form, the peculiarity of function gives every variety of ſymptom. The brain, burſting as it were from the cranium, from fulneſs of blood, the moment the ſcull-cap is raiſed; the reddened membranes, the turgeſcent veins; the effuſed ſerum, the enlarged cavities; the veſicular riſings upon the plexus choroides, the gelatinous effuſions betwixt the lamellæ of the pia mater, bear a plain direct analogy with ſimilar changes in an inflamed limb. Small aneuriſmal cavities in the ſubſtance, and on the ſurfaces of the brain, are a frequent conſequence of high vaſcular action. Whereas pain only is excited in a limb, in a certain ſtage of vaſcular action, madneſs, delirium, phrenzy, accompany the ſame ſtage of inflammation of the brain: that ſuffocated ſtate of the veins and cellular ſubſtance, which ſtops the circulation of a limb, and kills it, oppreſſes the function of the brain, and paralyſes the whole body: theſe, then, are pure and natural conſequences of the peculiar function, and univerſal influence of the brain over the ſyſtem. Inflammation of the eye cauſes tumor, redneſs, and exquiſite ſenſibility, ſo that all objects appear red, and the light cannot be endured; but when effuſion happens, when blood is poured out from violent action into the cavities of the eye, when, from the tranſlucidneſs of the organ, you can look down into its centre, and ſee (as I had the unhappineſs laſt ſeaſon to ſee in many inſtances of an epidemic ophthalmia) blood effuſed into the cellular ſubſtance of the vitreous humour, the patient is blind, for the organization is irrecoverably deſtroyed.

If it ſeem difficult to imagine how ſymptoms and diſeaſes ſo diſcordant and ſo oppoſite as lethargy and phrenzy, madneſs and palſy, can ariſe from various ſtages of vaſcular action, from varieties of one cauſe, let it be remembered, that any ſtage of vaſcular action exceeding the healthy ſtate of it, cauſes various changes on the intimate ſtructure, attended with proportioned changes on the function of the part; that thoſe changes are manifeſted after death; that if this be a difficulty in the plain and level way of obſervation and diſſection, it is much more conſpicuouſly a blemiſh in every general doctrine; for whether it is by remora and obſtruction of veſſels, by ſpaſm on the ſurface, or debility of the whole frame, that the theoriſt explains diſeaſes, the various ſymptoms and periods of diſeaſe, of fever for example, are imputed to varied operations of that one cauſe, which

ſhews that phyſicians have been always conſcious of various phenomena riſing up in the courſe of one progreſſive action, which action I affirm to be an irregular circulation, followed by a change of ſtructure almoſt always demonſtrable after the fatal concluſion of the diſeaſe. But when we proceed to examine what the changes are, which conſtitute the apoplectic, the paralytic, or the hydrocephalic ſtates of the brain, we feel confidently, that we are no longer forming probable or pleaſing conjectures about ſome indefinite ſtate of the veſſels; we do not ſpeculate, but inveſtigate; we prove, by reaſoning and diſſection, and reſt confidently upon thoſe proofs.

It is not poſſible to be employed in diſſections for ages, without making ſome approximations to truth; and accordingly, pathologiſts, without having gone decidedly back to the great cauſe from which both the ſymptoms of diſeaſe, and the phenomena appearing on diſſection, proceed, viz. increaſed circulation, or venous congeſtion of blood, yet have obſerved very carefully all the conſequences of that increaſed circulation: all that implies the exiſtence of excited vaſcular action, they have proved by innumerable diſſections, but the effects of it on the ſubſtance of the organ itſelf they never ſuſpected, even while they deſcribed the effuſions into its cavities, or on its ſurfaces. To theſe effuſions they imputed the diſeaſe and its ſymptoms; thence came the long eſtabliſhed diſtinctions of Apoplexies, Sanguineous and Serous, Atrabilious, Pituitous, and even Flatulent *. Incorrect obſervations led the older pathologiſts into wretched theories; as they knew nothing of abſorption, either lymphatic or venous, they imagined that ſerum, once effuſed, muſt find a direct paſſage out: they never ſuſpected that the openings from ventricle to ventricle were, in their natural ſtate, cloſed by the adheſion of the plexus and velum: they believed them patent, and that whatever fluid was effuſed into either of the lateral ventricles, paſſed eaſily from them into the third, from the third into the fourth, and from all of them into the infundibulum; and when water was found in the ventricles, they ſuppoſed it to be from this laſt ſluice being obſtructed: "If theſe paſſages (ſays Morgagni) be clo-

* Cardanus ſtoutly denies that there exiſts any ſuch thing as the pituitous or ſerous apoplexy. He aſcribes all to the atrabilis: "Dico nullam apoplexiam fieri ex pituita, proximam huic, omnem apoplexiam ex atrabile fieri;" and he reaſons well: "Præterea, ſi apoplexia e pituita præcipue fieret, et hi maxime ſenes corriperentur apoplexia, qui pituita abundarent in cerebro, atque ita gravedinibus et rancedinibus laborare; ſic et aquæ potores, et non vini, ſomnolenti, et non vigiles; at nihil minus horum." When do we ſee theſe cool-blood patients ſeized with apoplexy? The ſanguineous, the paſſionate, the ſhort-necked, the free-living, luxurious, and indulgent; men paſt the middle periods of life are the chief victims of this diſeaſe, which, with the vulgar, is comparatively rare.

ſed up, a great dropſy of the brain will enſue;" and his 37th article is appropriated to the diſcloſing of this important fact, "That an occluſion of the infundibulum hinders the defluxion of the moiſture from all the ventricles of the brain *." They thought only of theſe irremediable obſtructions, without ever reflecting on that diſ-

* The procreation of one falſe conception upon another is wonderfully rapid, and you may diſtinguiſh a family-likeneſs among all the progeny. Thoſe doctrines about the uſes of the ventricles, and the conſequences of the ſeveral paſſages from one cavity to another being obſtructed, are old, for they were known in the days of Galen. Firſt, The ſeveral faculties were imagined to be diſtinct ſecretions, of which each ventricle elaborated its own proper ſhare. Secondly, That the motion of the ſpirits from ventricle to ventricle muſt create great and manifeſt diſturbance, and confuſion of ideas and faculties. Thirdly, That along with this morbid abſtraction of the courſe of the ſpirits from cavity to cavity, the coarſer parts, the ſuperfluities, as Galen calls them, the parts which ſhould be drained off through the infundibulum, &c. muſt be inſtructed, and all the finer ſpirits entangled in the thick pituita, or drowned in the lymph which was thus collected in the ventricles.

It is chiefly from Galen, in his book De Usu Partium, that the phyſicians of Europe have imbibed their opinions about the uſes of the ventricles: "Anteriores duo ventriculi, inſpirationem et expirationem, efflationemque ex cerebro efficiunt; hæc enim alibi demonſtrabimus. Nec minus quoque demonſtrabimus, quod prius quidem conficiunt, ac præparant ipſi cerebro ſpiritum animalem; atque etiam et quod inferius ſuis partibus, quæ ſpectant ad nares, ſimul quidem olefactorium ſunt inſtrumentum, ſimul autem veluti ductus quidem ac canalis ad ſuperfluorum effluxionem accommodus, paulo ante indicavimus,"—Cap. x. In deſcribing the via crassorum cerebri superfluorum, he proceeds to ſay, "Rurſus igitur ad reliquum genus meatuum cerebrum purgantium, reverſi, naturæ in his artificium explicemus," &c. How he explained them, how his ſucceſſors commented upon his text, how minutely the ſeveral diſtillations of the ſeveral cavities of this wonderful organ were underſtood and deſcribed, as if the brain had been a "limbec only," will be found by the following ſerious deſcription of Guido. "The brain, according to its length, is occupied by three cavities, and each cavity has two parts, and in each part is prepared a quality. In the anterior part of the firſt cavity reſides *common ſenſe*; in the ſecond, the *imaginative faculty*; in the middle ventricle is inſtalled the *cogitative and rational faculties*; and in the laſt and poſterior cavity are depoſited the faculties of *memory and recollection*; and among theſe cavities the anterior is larger, the middle ſmaller, the poſterior of an intermediate ſize; and from one to another are *paſſages for the tranſit of the ſpirits*." No wonder, while all this chemiſtry and cookery was going on, that ſometimes *fuliginous* vapours diſturbed the brain, and obſcured theſe chambers of the faculties, or that in theſe contiguous laboratories the ſubtile and precious qualities were a little confounded and mixed.

"Cerebrum ſecundum longitudinem habet tres ventriculos, et unuſquaque venter habet duas partes, et in qualibet parte organicatur una virtus. In prima parte ventriculi anterioris, aſſignatur ſenſus communis; in ſecunda, imaginativa, in medio ventriculo ſituatur cogitativa et rationalis; in poſteriori vero, ſervativa et memorativa. Et quod inter iſtos ventriculos anterior eſt major, medius minor, poſterior mediocris, et de uno ad alium ſunt meatus per quos tranſeunt ſpiritus."—*Guidon*, tract 1.

Willis, cap. xii. in deſcribing the occaſional relief from headachs experienced by a lady, whoſe recovery from a paroxyſm was uſually preceded by a trickling, as if of water, along the forehead, and the ſubſequent diſcharge of a few drops from the noſe, ſeems willing to refer the whole phenomena to the alternate obſtructing and opening of the natural openings and communications among the ventricles, and through the infundibulum.

ordered ſtate of circulation, which might be ſo eaſily regulated, and which was truly the cauſe of ſuch ſerous colluvies. The apoplexy is juſtly divided (ſays Boerhaave) into ſerous and pituitous; but the diviſion is by no means perfect, ſince there are alſo apoplexies from Atrabiles, from Pituita, from Gelatinous matter, from Polypi, and other cauſes *;" and from all that I can collect, the induſtry of theſe old phyſicians, in obſerving the peculiar matter found effuſed upon the brain, was ſharpened by a perſuaſion expreſſed in all their writings in very direct terms, that the irritations produced by ſuch ſerum, pituita, and atrabilis, were various, and the ſymptoms conſonant to the kind of irritation.

That in modern times the belief even of a *Flatulent Apoplexy* could have prevailed, muſt ſeem to you almoſt incredible. Morgagni had, in reſpect to the collections of water and other effuſions into the cavities of the brain, but one ſolution for all kinds of difficulties, mighty ſimple and ingenious, when once you could be perſuaded of the fact, and very univerſal, too, in its application, viz. "That when a thing cannot get out, it muſt ſtay in." Morgagni, when he ſets himſelf to account for that air, which, upon a vein being tied, and put under an exhauſted receiver, bubbles out, does not conjecture, like Littre and others, how it may have got into the vein, but proves plainly, that whatever way it got in, it cannot get out. "For if (ſays Morgagni), and your *if* is an excellent ſolver of difficulties! thoſe ſmall pores through which the air is to paſs outwards from the blood be by any means conſtringed and ſtopped up, the others continuing pervious, whoſe office it is to admit air into the blood, in as much as they are appendages of the pulmonary veins, and not of the pulmonary artery, you ſee that immediately too great a quantity of air will be collected in the blood." But unfortunately the number of *ifs* in this proceſs of reaſoning is ſuch as excludes every thing elſe. If there be pores which admit air into the blood, and if there be other pores calculated to exhale the ſaid air; and if theſe pores be of ſuch a nature as to be conſtringed; and if the inhaling pores be open while the exhaling excrementitial aerial pores are conſtringed; why, then, it is plain as the ſun at noon-day, that there muſt be a whole tempeſt of aerial particles accumulated in the blood. The paſſage I have inſcribed below from Bartholin †, in vindication of this ſame doctrine, is

* Aphoriſm 1012.

† That through this artery, "in bodies that were ſound, recrementitious matter was diſcharged in expiration, which is nothing elſe but the aerial particles excited in the blood of the heart, and the other parts of the body;

well worth its place on the margin. Thus does Morgagni not only intimate, but prove, that beſides the pituitous, ſerous, and atrabilious, there may be a flatulent apoplexy, from wind collected in the veins of the brain, and preventing their circulation; juſt as Avicenna obſerves, "That a great pain of the head is brought on by the arteries bringing noxious vapours to the brain." He does not hint it obſcurely, as a thing he were afraid or unwilling to affirm, but ſays *, "This being the ſtate of the queſtion, it appears, that if air ſhould beſet many of the ſmaller veſſels of any certain part at one time, the motion of the blood, and any thing depending thereon, muſt be interrupted. *Suppoſe*, then, that this part be the brain, and you will inſtantly underſtand how an apoplexy might ariſe therefrom! and you will commend Hollerius, who ſays expreſsly, "that apoplexies are brought on even when the carotid arteries are obſtructed in the rectiform plexus, by *flatus, or any thing elſe.*" Unfortunately for this pneumatic apoplexy of Hollerius and Morgagni, there is no ſuch peculiarity of ſtructure in the human body, as that of the rectiform plexus, which is peculiar to brutes.

Were I addreſſing my diſcourſe to thoſe who had ſtudied pathology in books, who had made up their belief, and could find no cauſe adequate to the phenomena of diſeaſe ſlighter than a tumor, oſſification, or burſting of an artery, I ſhould deſpair of doing good. But I hope for better ſucceſs in addreſſing myſelf to you, whoſe minds are yet untainted with prejudice, ready to examine and compare impartially the marks of accelerated circulation with the diſmal ſymptoms which it cauſes; and I confidently direct you to fix your obſervation, not on

(or, as he had ſaid before, nothing but the air and ſuperfluous flatus of the crude blood), from whence alſo the flatus, that was troubleſome in the veins, according to Hippocrates and Galen; which, if not evacuated by the *common fan of the body*, not only bring on various painful ſymptoms, but even, if they ſtagnate, may cauſe a rupture of the veins, or raiſe the whole body into a tumor." And Plato, alſo, ſeems not only to have touched upon the whole of this hypotheſis, but that likewiſe which I ſhall afterwards ſubjoin; and I am not ſorry to quote his own words on the occaſion; for he ſays, "When the lungs, the guard, and as it were the *ſtore-keeper of the breath itſelf*, being obſtructed by defluxion, has not its vents free and open; and, on one hand, no air is diſcharged; and, on the other, more than is neceſſary is received; then thoſe parts which want reſpiration and cooling wither away. But *that which is received over and above, being carried through the veins, tortures them, and melts down the body.*" And a little after, "Air is often generated, even within the body, when the fleſh is flabby and rarefied; *which, as it cannot get forth*, gives the ſame pains as air would *that came in from without.* But it then gives moſt excruciating pains, when it inflates and diſtends the nerves and veins that lie round it.

* Art. 18.

oſſifications, obſtructions, and tumors, but on thoſe ſtates of the circulation which leave often but ſlight and evaneſcent marks. Extravaſations of blood, or effuſions of ſerum, are indeed frequent in apoplexy; often a blood-veſſel giving way is the immediate cauſe of death; but theſe are merely concomitants or conſequences, by no means eſſential to the apoplectic ſtate, which is ſimple, and conſiſts merely in the fulneſs of the vaſcular ſyſtem of the head: After a man having dropped down apoplectic, there is often found, after death, no diſorder of organization; it is by inference and general appearances only that the ſtate of the brain can be proved.

The pure apoplectic ſtate of the brain conſiſts merely in accumulation of blood in its veſſels: What the marks are of that accumulation, by what cauſes it is produced, by what ſymptoms accompanied, I ſhall now proceed to relate. The marks of the apoplectic ſtate are ſuch as ſtrike the recollection of every one who has ſeen the head opened, and are expreſſed by almoſt every ſpectator in words nearly ſimilar. Upon cutting open the dura mater, and turning it upwards, when the ſurfaces of the hemiſpheres of each ſide of the brain are diſplayed, we obſerve the pia mater red, and its vaſcularity more apparent: the general redneſs is interſperſed with maculæ, or broad ſpecks and ſpots of extravaſation, ſlight and diffuſed, and of a glutinous appearance within the reddened membrane: the great veins of each hemiſphere are ſeen numerous, their branches ſwollen to the ſize of trunks, and the trunks unuſually diſtended, tortuous, and filled with a black and grumous blood, as if long collected and ſtagnant. The expreſſions by which this appearance is deſcribed, are very impreſſive. "Venæ quaſi varioſæ: vaſa meningum et cerebri ſanguine ad ſummum turgida." But while the ſuperficial veins are thus viſibly diſtorted and dilated, all the vaſcular ſyſtem of the head is ſo full of blood, that the brain is univerſally turgid, and the compreſſion which it endures before death is evinced by the manner in which it burſts as it were from the ſcull in the diſſected head. "The ſcull ſeems too ſtrait for the brain." "Cranium videbatur vix cerebri capax, præ ſumma illa plenitudine et diſtenſione vaſorum membranarum, quodammodo liventium *." "Cranium nimiam cerebri molem non poterat capere." "Calvaria aperta, vaſa meningas obducentia erant ſanguine referta, et plurimum diſtenta, quaſi cruoris maſſa tota illic confluxerat." In ſhort, the brain ſeems to burſt from its confinement; the veſſels appear numerous, tortuous, and diſtended; the blood is dark, grumous, and ſettled in the veins; upon opening the ſinus, the black blood ruſhes out, and inun-

* Bonnetus.

dates the brain; upon cutting into its ſubſtance, the red points and gouts of blood, indicating the ſections of the internal veins and arteries, are large and frequent: judge, then, how much each individual particle of the brain, incloſed within the unyielding ſcull, and preſſed by ſuch a force of circulation within its ſubſtance, muſt ſuffer. This conſtitutes the ſimple ſtate of apoplexy, and thence it proceeds that many expire, in whoſe brain there appears none of the expected marks of diſorder: "Nulla veſtigia mali, nec ſanguis, nec aqua, nec ichor."

When a perſon falls down apoplectic, it is moſt natural to imagine that ſome blood-veſſel has given way within the head. This concluſion glides imperceptibly into the mind, from our having often read, and uſually found upon diſſection, that when the perſon drops down dead, blood is thus effuſed, without recollecting, that a thing common may yet not be eſſential to the apoplectic ſtate, without remembering how nearly the effects of running, wreſtling, ſtruggling in a mob, or other violent exertions, approaches to a fit of apoplexy; how often, after ſuch exertions, the patient feels almoſt apoplectic, or entirely ſo, and yet recovers; how inconſiſtent ſuch recovery is with the conception of any giving way among the veſſels of the brain. It is related by Bonnetus*, that a woman of forty years of age, prediſpoſed to apoplexy, and ſubject to a heavy and dull pain of the head, but ſuch as ſeemed to threaten no danger, having one evening ſtooped to blow the fire in preparing ſupper, fell down inſenſible, and died in a few hours; yet in this caſe, where we ſhould naturally have expected to find marks of ſudden injury, there was no effuſion of blood, and no more ſerum than might have been collected by habitual diſtenſion of the veins, or effuſed in the hour of diſſolution, or after death. "Next morning, her head was opened; all parts of the brain ſeemed ſound, ſaving that the ſurfaces were ſuffuſed with a reddiſh ſerum, (a deſcription of ſerum which implies a very recent effuſion), and the veins varicoſe and diſtended." Willis relates ſhortly the caſe of a lady of high rank, many years ſubject to ſpaſmodic affections, and who had ſuffered much and long from gravitating pains of the head: On the night on which ſhe died, having ſlept ſoundly during the earlier part of the night, ſhe was awoke by a convulſive affection, which almoſt immediately ended in an apoplectic ſtroke, of which ſhe expired. A narrative like this conveys ſtrongly the impreſſion, that the patient has died from the burſting of a veſſel, and effuſion of blood, (which convulſion and oppreſſion, terminating in ſudden death, almoſt always imply); but in this lady there was found, upon raiſing the dura mater, no ſuch thing, no extravaſation, no

* Page 142.

peculiarity of appearance, but that univerſal diffuſion of ſerum, which perſevering headachs, attended with accumulation in the blood-veſſels, always cauſes. but the whole circulating ſyſtem of the brain, both veins and arteries, were diſtended with blood. It is the ſuppreſſion of reſpiration in violent ſtruggles that injects the blood ſo into the head, inflates the viſage, and forces the internal veins of the brain, as it does the external veins of the forehead and temples, till giddineſs, blindneſs, tinnitus aurium, enſue; and it is when by ſuch accumulation of blood the brain is compreſſed, and the muſcular power univerſally affected, that the patient drops down. It is recorded by Hildanus *, of a boy of fourteen years of age, that, having wagered with a companion that he would ſneeze a hundred times running, he went to work, and, by inceſſant tickling of his noſtrils, had ſneezed out his hundred times and more, when ſuddenly he was ſeized with pain of the head, and dimneſs of ſight, which on the following day was entirely gone; but he had neither fever nor inflammation of the eyes, and in a few days he was reſtored to his ſight by the preſcriptions of Hildanus, Saracenus, and Bonet, chiefly by planting a ſeton in the neck, and cupping-glaſſes on the ſhoulders, to make revulſion †.

" A boy, (ſays Peter Zitzilius), in whipping his top, ſtooping and riſing alternately, with his neckcloth drawn ſo extremely tight, as to check the circulation of the head, fell down ſuddenly in a complete apoplexy; but his neckcloth being inſtantly undone, and blood drawn from the jugulars, he was ſaved, and reſtored to ſenſe and motion, which were entirely gone ‡."

You thus perceive, that the ſimple apoplectic ſtate, the mere diſtenſion of the arteries and veins, makes the patient fall down inſenſible; his recovering thus proves, that the organization has not ſuffered, that no veſſel has given way, that the regular

* Centur. i. obſ. 24.

† " Adoleſcens 14 annos natus, et phlegmatici habitus, cum æquali ſponſionem fecit, poſſe ſe ſternutare ad libitum, imo etiam centies. Depoſito pignore, cœpit ex immodica titillatione irritatis naribus ſternutare, circiter centies et amplius. Exin protinus correptus eſt dolore capitis et hebetatione viſus, qui etiam ſequenti die deperditus fuit, citra tamen inflammationem oculorum aut febrim. Convocatis mecum clariſſimis doctiſſimiſque viris, Jano Antonio Saraceno, et Andrea Boneto, decretum eſt, ut purgato corpore ſetaceum adhiberetur collo, uti et ſcapulis cucurbitulæ; atque his uſus revulſionibus, viſum paucos poſt dies recepit."

‡ " Adoleſcens, dum ſæpius deorſum et ſurſum caput deprimeret et elevaret, collo nimium per collare conſtricto, ſubito concidit vere apoplecticus. Laxato vero collari, et vena ſecta, ad ſe feliciter rediit; reſtitutis ſenſibus et motibus, quos omnino perdiderat."—Act. Acad, Scienc. Suecive, ann. 1757.

courſe of the circulation can be eaſily reſtored. This young man, thus falling down, and thus reviving, conſtitutes the intermediate ſtate betwixt complete apoplexy, and that giddineſs, confuſion, and ringing of the ears, which we feel upon any unuſual exertion, and which we ſee in rope-dancers, horſemen, wreſtlers, trumpeters, &c. accompanied with an inflation of the face, and protruſion of the eyes, not without danger. This venous congeſtion is the kind which follows from glaſs-blowing, diving, and all ſuch exertions as ſuſpend reſpiration. This is the condition of thoſe ſuffocated by hanging, drowning, or the fumes of charcoal. It is not by ſuſpended reſpiration, or want of oxygenated blood, they expire, but from the circulation within the head being ſuſpended, and from the accumulated blood compreſſing the brain within the limited cavity of the ſcull. I have remarked thoſe drawn from a choke damp, or found in a chamber full of carbonic gas, breathe long. I have ſeen them breathe for hours, with a ſtertorous noiſe, an oppreſſed and ſlow pulſe, a dilated pupil, the face and neck diſtended and diſcoloured, with venous blood, bathed in a cold ſweat, with tremblings of the limbs, and irrecoverably apoplectic. Of two men ſuffocated in one bed, I have reſtored the one, and loſt the other patient. "I have had innumerable opportunities (ſays Walther) of diſſecting the bodies of the drowned, and I have ever found the ſtomach and the lungs equally free from water, and wateryfroth. The epiglottis, as uſual in other dead bodies, but always the veins of the head, very turgid with blood, as in thoſe who are hanged *." This was the occaſion of the death of the black trumpeter, related by Morgagni. "There was an Ethiopian at Venice, who was thirty years of age, of a maſcular make, and in good health, unleſs that in the laſt months he had been ſubject to a certain languor of his ſtomach, joined with a ſlight ſweating, which, however, immediately went off, on taking food. This man, about the middle of July, in the year 1708, being very chearful with his friends at breakfaſt, for it was in the morning, and ſtanding to play on the trumpet, as he uſed to do; while he was playing, fell backwards ſo gradually and ſlowly, that his companions would

* "De vero modo quo ſubmerſi moriantur, in Gallia magna fuit lis, et quæ me judice non ſatis explicata eſt. Omnis res eo redit. Quæritur, An in pulmonibus et in ventriculo ſubmerſorum unquam aqua ſit inventa, et quomodo epiglottis ſe habeat? Explicatio hujus queſtionis omnino magni momenti et difficilis eſt, maximeque tractatio prudens ſubmerſorum et remedia convenientia pendent.

"Mihi occaſio fuit magnam copiam hominum ſubmerſorum inveſtigandi, nunquam vero aquam in ventriculo, nec aquam ſpumantem in pulmonibus vidi, epiglottiſque eodem modo ſe habuit ut in omnibus reliquis hominibus fieri ſolet; vaſa cerebri ſanguifera, ut in ſuſpenſis, ſanguine turgida inveni."—*Walther*, § 26.

have thought he did it by way of amuſement, if they had not obſerved certain tremors running over his whole body as he fell. He died, however, the very moment that he fell."

In all violent exertions, and ſudden efforts of reſpiration, in that ſtraining which we ſee inflate the head and neck of a porter, or ſailor, when working at the crane, or heaving on the capſtan, the danger ariſes from having the lungs in a continued ſtate of compreſſion, expiration long continued, the blood prevented from entering into the thorax, and accumulated in the head. In cough, aſthma, tumors of the thyroid gland; in choke-damp, drowning, and every caſe, complete or partial, of ſuppreſſed reſpiration, the difficulty is in inflating the lungs, and the blood is by laborious reſpiration at once impelled into the head by an accelerated pulſation of the arteries, and retarded by compreſſion of the veins, as is evinced by the pulſation in the temples, and the turgeſcence of the neck; thence apoplexy, or accumulation of blood, and palſy, or burſting of the veſſels, are dangers inſeparable from this ſtate. In the convulſive paroxyſm of the hooping-cough, while the child clings to ſomething for ſupport, its face and neck ſwell at every ſucceſſive ſtroke of the lungs; its eyes ſtare, and are protruded, its face is purple, its limbs tremble, and it becomes giddy, and often falls down in a fit. Obſerve the condition of a patient, who is in danger of ſuffocation, from ſome accident at table, how the face and neck ſwell, the eyes become prominent and ſuffuſed; how the blood ſometimes guſhes from the noſtrils, how the ſenſes are gone; the head falls upon the ſhoulder; the patient drops down powerleſs, and recovers by ſtillneſs from a ſtate of moſt imminent peril; and when ſuch patient dies, it is of apoplexy, and there is found, upon diſſection, dilated veins, a turgid brain, and every mark of congeſtion of blood. "Nos inter alia novimus (ſays Hoffman *) a mica panis aſperæ arteriæ illapſa, vehementiſſimam concitatam fuiſſe tuſſim, quem excepit hæmorrhagia in cerebro, lethali cum eventu." Even from the very firſt moment of ſuffocation, the apoplectic ſtate, with all its conſequences, the congeſtion in the head, with inſenſibility and ſtupor, is formed, and the whole of the enſuing ſcene is a ſucceſſion of apoplectic inſenſibility, and unavailing ſtruggles, till the patient expires. From the firſt moment, the head ſeems as it were injected with blood, and reminds me of the change produced upon a dead body, by injecting the carotids ſo ſtrongly with ſize, as to fill the veins. Once in preparing to diſſect the brain of a man who had

* § xi. cap. 7.

died of an injury of the head, I injected it with ſize, and, for particular purpoſes, ordered a caſt of the head, little imagining how ill ſuch a head would repreſent the features of death. The features were ſo diſtended with the ſize-injection, the mouth diſtorted, the lips protruded, the forehead and its veins ſwelled, and the eyes projected, as to repreſent a ſtate of apoplectic drunkenneſs, making the caſt uſeleſs for any purpoſe, unleſs it had been for a drawing of Silenus.

There is one fact worth your notice, ſince it proves, in the moſt curious manner, that apoplexy is, in thoſe who are drowned or ſtrangled, the ſole cauſe of death, and the conſtriction of the neck the ſole cauſe of the apoplexy. "Thoſe ſtrangled, (ſays Sauvages), unleſs the neck be actually broken and diſlocated, (which ſkilful executioners know how to accompliſh), are eaſily reſtored to life, as I can affirm from having frequently revived animals after experiments of this nature, and once a man after execution. He was brought from the gallows into a church, when by bleeding him thrice in the courſe of two hours, he was not only brought to life, but felt ſtrong and well, for he ſat upright, carried a water pitcher to his head with his own hand, drank plentifully out of it, and ſaid he was very hearty. But he ſaid, (and it will hardly ſeem ſurpriſing), that he was a little hoarſe or ſo, and his voice weak, nor could he ſpeak even in that feeble tone, without expectorating a little blood, and drinking abundantly out of his pitcher. Though the weather was by no means ſultry, he delighted in a continual draught of cool air, for he was very feveriſh. In about three hours, the mark of the halter, which had almoſt diſappeared, began to redden and ſwell, and foreſeeing a new obſtruction to the return of the venous blood, and a ſubſequent torpor, I directed that he ſhould be bled from the jugular, for the fourth time. But the young ſurgeons had been alarmed, and taken flight, the bleeding was neglected, he fell into a ſtupor, the pulſe became gradually ſlower, ſo that it hardly beat forty in the minute; though it had manifeſtly riſen upon the firſt bleeding, it now grew weak as well as ſlow; and this poor ſoul, whom no crime had brought to the gibbet, was allowed to die, a ſecond time *."

* "Eſt mors apparens eorum, qui recens ſtrangulati, vel ut mos eſt, fune ſuſpenſi ſunt, ſimilive modo ſuffocati; illi certe, niſi ſimul colli quædam vertebra luxata fuerit, quod periti carnifices norunt, facile ad vitam revocantur, ut expertus ſum aliquoties in brutis, ſemel in homine, qui e patibulo allatus in templum, tribus phlebotomiis intra duas horas inſtitutis, non ſolum vitæ, ſed ſatis commodo ſtatui, reſtitutus eſt; ita ut ipſe ſedens, et aquam ex urceolo, quem manu geſtabat, affatim bibens, bene ſe habere mihi diceret; vox autem rauca, initio-

" Mr C. a young gentleman uncommonly athletic, about ſix and twenty years of age, had been wet in hunting, had ſat in wet cloaths, and ſupped abroad, and continued revelling in the ſtreets, ſtill wet, and expoſed to eaſt fog. He was ſenſible next morning of a ſlight cold, but without cough, anxiety, or difficulty of breathing. In the evening, while ſtanding by the parlour-fire, after having drank a glaſs of ſpirits and water, he was ſeized with an aſthmatic paroxyſm, a tickling cough, noiſy reſpiration, and great difficulty in drawing his breath. He was carried up to his bed-room, where, even on the third floor, you could diſtinctly hear his croupy and aſthmatic breathing the moment you entered the door. The paroxyſm, the immediate ſenſe of ſuffocation, ceaſed, but the difficulty of breathing never did. In the firſt moments of his diſtreſs, when profuſe bleedings might have ſaved him, æther, laudanum, hartſhorn, and every ſtimulant and dangerous medicine, were poured in profuſely, and with every doze he ſeemed worſe. In twenty-four hours the aſthma became permanent, the ſpaſmodic conſtriction was unremitting, the crowing of his voice was heard diſtinctly through all parts of the houſe. The ſcene of ſtruggling and agony was unceaſing, and the apoplectic ſtate begun, when I was called to his aſſiſtance, and in my turn requeſted the advice of my valuable and learned friend, Dr Rutherford. He now began to ſlumber and ſnore, his face was purple, his faculties quite obſcured, his neck turgid, his breaſt bedewed with a cold and clammy ſweat; his head hung forward in a ſtate of apoplectic ſtupor, while he was ſupported behind by his brother and friends. He ſometimes lifted his eyes heavily, and again ſtruggled for breath in great agony. The bleedings, and the application of rubefacients and bliſters to his throat and breaſt, ſeemed to give him ſome relief, but we became ſenſible, that after ſuch long-continued ſtruggles, after tugging ſo hard for life, a complete ſtate of apoplexy muſt have taken place in the head, and effuſions of

que tenuis erat, nec eam edere potuit, niſi expectorato cruoris pauxillo, et multa frigidæ copia hauſta; ardebat enim ſiti et ſimul frigido aere continuo afflato indigebat, utcumque minime calida foret tempeſtas; poſt tertiam horam colla a fune impreſſum veſtigium paulatim evaneſcens, etiam intumuit, et quartam e jugulo ſuaſi phlebotomiam, apprime percipiens, regreſſum ſanguinis e cerebro mox impeditum iri, unde carus; ſed chirurgis præ metu fugientibus, non inſtituta fuit hæc phlebotomia, unde æger ſenſim obdormivit, pulſus rarior ſenſim evaſit, ita ut vix quadrageſies pulſaret in minuto, minorque evaſit, quem poſt primam phlebotomiam videram ſenſim apparere, et æque raro micare, dein paulo frequentiorem et fortiorem gradatim evaſiſſe; ſic obiit miſer ille, quem nullum ſcelus ad patibulum duxerat."

blood into the cells of the lungs. After reclining three days with his head hanging forward in this ſtate of apoplectic ſtupor, he expired on the fourth.

Upon opening the body, we found the throat ſound, the epiglottis not ſwelled, the glottis relaxed and open, the trachea little inflamed, and no mark of diſeaſe, except a ſmall ulcer, like the baſon of a variolous puſtule, or like a very ſmall chancre, ſeated on the lining membrane of the trachea, juſt within the rima glottidis, and which had excited this unremitting ſpaſm of the glottis, as a foreign body dropping into the opening would have done.

Wherever I have had the unhappineſs to ſee a patient die of ſuffocation, whether ſlow or ſudden, the phenomena of apoplexy have been always the moſt prominent, eſpecially the fulneſs of the head from injected blood, and the inſenſibility and ſtupor from oppreſſed brain. " A lady, who from delicacy and fear had been long of diſcloſing to me a tumor of the thyroid gland, was far gone in pregnancy, and from her new condition, not only oppreſſed, but in continual danger, and already ſeized with the fatal obſtruction of breathing, before ſhe ſent for me. The tumor ſurrounded the whole throat, was ſoft and unequal with matter, which ſoon after burſt out from various points, with an increaſe of ſwelling, and with a hardening which increaſed the conſtriction : and as her bulk increaſed, the agonies, and fits of anxious breathing, became more frequent. The dyſpnœa, in all ſuch caſes, plainly proceeds, not from the mechanical preſſure of the tumor, for it would then be uniform, but from that ſpaſm of the glottis, which any difficulty, either a puſtule within, or a tumor without, produces, and which recurs in paroxyſms.

No ſituation could be imagined more deſolate than this lady's; the child's motions were now diſtinctly felt; the ſize of the womb, and the tumor of the gland, increaſed *pari paſſu ;* the face, pale and bloated at other times, was at each paroxyſm of dyſpnœa ſuffuſed and purple. I was called from my bed, from company, from lecture, at all hours, to witneſs her unhappy ſtruggles for breath, which always ended in a ſtate of apoplectic ſtupor. At each paroxyſm, her extremities grew cold, her eyes cloſed, ſo as to ſhew only a ſmall part of the white ; her head fell upon her breaſt in a ſtate of inſenſibility, the blood making her face and neck black and livid at the time, and green after each violent ſtruggle from extravaſation ; and ſhe lay for many hours ſnoring and oppreſſed.

" When ſhe had attained the eighth month of her pregnancy, I was called one morning very early. She had been ſuffocating for ſome time, and now her face and neck

were actually black with the congeſtion of blood; her head hung forward; her temples were bedewed with a clammy ſweat. Though oppreſſed, and almoſt inſenſible, ſhe ſometimes raiſed her eye languidly, and turned it towards the open window. Her breathing was ſtill, and quiet; after lying thus in the arms of the attendants five hours, oppreſſed, and in a ſtate of deadly ſtupor, her extremities became cold; but before ſhe expired I delivered the child, and was ſenſible, in doing ſo, that the viſcera were cold, and that the circulation began to ceaſe: the child was dead. In this, and all caſes of ſuffocation, I have ever found the laſt ſtruggle terminate in a ſtate of apoplexy; the brain, on account of its peculiar circulation, and extreme delicacy, ſuffering in its eſſential function, while other parts are merely diſcoloured, or ſwelled, by the injected blood. It is the brain alone that ſuffers, it is the congeſtion of the blood that deſtroys *.

On the ill conſequences of indulgences, of particular occupations, of diſeaſes ap-

* My readers will ſmile, perhaps, to ſee me quoting Shakſpeare among Phyſicians and Theologiſts: but not one of all their tribe, populous though it be, could deſcribe ſo exquiſitely the marks of apoplexy, conſpiring with the ſtruggles for life, and the agonies of ſuffocation, to deform the countenance of the dead.

" See how the blood is ſettled in his face!
Oft have I ſeen a timely-parted ghoſt,
Of aſhy ſemblance, meagre, pale, and bloodleſs,
Being all deſcended to the labouring heart;
Who in the conflict that it holds with death,
Attracts the ſame for aidence 'gainſt the enemy;
Which with the heart there cools, and ne'er returneth,
To bluſh and beautify the cheek again.
But ſee, his face is black and full of blood;
His eye-balls farther out than when he lived,
Staring full ghaſtly like a ſtrangled man;
His hair uprear'd, his noſtrils ſtretch'd with ſtruggling;
His hands abroad diſplay'd, as one that gaſp'd
And tugg'd for life, and was by ſtrength ſubdued.
Look, on the ſheets, his hair, you ſee, is ſticking;
His well-proportion'd beard made rough and rugged,
Like to the ſummer's corn by tempeſt lodg'd.
It cannot be, but he was murdered here;
The leaſt of all theſe ſigns were probable."

So curiouſly does our Poet preſent to our conceptions all the ſigns from which it might be inferred that the good Duke Humphrey had died a violent death.

parently ſlight, but really terrible in their conſequences, we are apt to reflect too little; yet nothing is more unqueſtionably true, than that thoſe actions which thus produce ſudden apoplexy by their violence, will, in a ſlighter degree, and operating ſlowly, produce prediſpoſition. The Rachitic, the Aſthmatic, the Deformed, Porters, Coal-heavers, Glaſs-blowers, Trumpeters, and Baſſoon-players, all who have the cheſt naturally ſtraight, and the neck ſhort, or whoſe occupations violently arreſt the breath, or impel the blood into the head, are in danger of apoplexy. Yet this is not the true prediſpoſition: this unnatural obſtruction of the blood, and dilatation of the veins, is not ſo effectual in accumulating blood, as the vigorous action of the arteries. Accidental impulſion of blood into the head ſometimes loads the veins, and compreſſes the brain in an irrecoverable degree; ſometimes burſts through the veſſels, ſo that the patient drops down paralytic, or dead; but it is a ſtate from which, as there is no prediſpoſition, no particular action of the arteries, no previous dilatation of the veins, the patient recovers. Deformity, and other cauſes, producing difficult breathing, do, by operating throughout the courſe of a long life, produce that kind of prediſpoſition to Venous Apoplexy, which is ſo often conſpicuous in old age, which is marked by a habitual lethargy, ſtupor, and hebetude of the ſenſes, and is found after death to be accompanied with a ſerous effuſion. But, apoplexy is a very different diſeaſe, and the prediſpoſition of a moſt peculiar nature: it is an active impulſe, a ſort of hemorrhagic effort in the arteries of the brain, ſo violent, that they often give way, and the apoplexy, or ſtate of oppreſſion, terminates in palſy, or ruined organization. The diſeaſe is not unaptly named by Hoffman, Hæmorrhagia Cerebri.

I am accuſtomed, wherever, in external and ſurgical diſeaſe, I ſee a dilated ſtate of the veins, to look upon it as a ſign of high and irritated action in the correſponding arteries. Wherever the veins are no longer able to reſiſt the action of the arteries, that part or organ is going to wreck. When in tumors, for example, of the breaſt, the teſticles, the ſalivary glands, we ſee the veins rapidly dilating, and the part aſſuming a lurid colour, from ſtagnating or extravaſated blood, we judge that the arterial action is prevailing over the ſtructure of the part, and that ulceration is about to enſue. With perfect confidence do I apply to the brain an obſervation, which, if true, muſt hold in regard to every part and organ of the body.

The apoplectic prediſpoſition does not conſiſt ſolely in dilated veins, but in an irritable ſtate of the arteries of the brain. Prediſpoſition is not peculiar to old age, nor a mere conſequence of that gradual enlargement, and occaſional obſtruction and turgeſcence of veins which increaſes in the courſe of a long life, and which at laſt affects

the function, and is accompanied with ſerous effuſion. The apoplectic ſtroke is ſudden; it ariſes FROM AN ACTIVE IMPULSE OF BLOOD INTO THE ORGAN, FROM AN EXCITED STATE OF THE ARTERIES; and every patient you loſe, as well as every one you ſave, in your future practice, will prove this truth. Often I have ſaved my patients on the very brink of the precipice: when the temples were jarring with the inward pulſation; the whole frame ſhaken at each ſtroke of the heart; the pulſe heavy, ſlow, and ſtrong; the face inflated, and the eyes ſuffuſed with blood; the limbs tottering, and the ſenſes beginning to fail, and the fatal ſtupor begun! Let who will affirm apoplexy to be debility, the phenomena I have deſcribed, mark that critical impulſe of blood into the brain, which would many times, in my own practice, have terminated in the apoplectic ſtroke, had I not ſaved the patient by very copious bleedings, reſtoring him to that perfect health and ſtrength, which, had he once dropped down, was for ever and irretrievably gone.

Who are they who are moſt frequently ſtruck with apoplexy, and moſt manifeſtly prediſpoſed? Men in the very prime and vigour of life;—men of bulky make, of ſtrong and muſcular frame, ſquare and athletic, with full heads, ſhort necks, a ruddy and ſhining countenance, and a coarſe and granulated ſkin: men of great bodily ſtrength, and choleric paſſions: men, whoſe whole form indicates great natural vigour of conſtitution, relaxed, and bloated, only becauſe they have lived in a perpetual round of indulgence; who, with juſt ſo much exerciſe as ſupports perfect vigour of health, have taken much high-ſeaſoned food, mixed with wine; have never rejected the pleaſures of the table, where "death lies ambuſhed in every diſh," but ate luxuriouſly, and drunk the inordinate cup.

Of all prediſpoſition, that which we inherit from parents, and have by nature, that ſingular irritability of vaſcular ſyſtem of the brain, which expoſes us to ſudden excitements, from every ſlight cauſe, is the moſt dangerous. As men are born prone to paſſion, they are likewiſe born with this peculiar tendency of blood to the brain, from ſudden action of its arteries: Often ſo peculiar, and ſo ſtrong is this idioſyncracy, that a ſingle glaſs of wine, or a tranſient emotion, or paſſion, will excite the arteries of the brain, till the pulſation is felt painfully, and confuſion and giddineſs enſue. Many perſons of the moſt delicate habits, and the mildeſt tempers, have this ſuſceptibility, ſo that they cannot enjoy a full meal, or a moderate ſhare of wine, without, not the uſual drowſineſs, but abſolute torpor, and a degree of ſtupor, preceded by a heavy pulſation in the head. Many have a ſyſtem, making blood too faſt for its natural uſes, and have the neck, jaws, and head, peculiarly full, and turgid with ſuperfluous blood, the eyes prominent, the lips thick, and protru-

ding, the countenance flushed after every meal, or upon the slightest exertion; and such I have seen drop down apoplectic from but a slight aggravation of this plethoric state. Nothing is more universally acknowledged, than that whole families have died of apoplexy, even at early periods of their lives; and, I know, that their disease is a sort of febrile apoplexy, proceeding from an irritable constitution of this part of the vascular system *.

Each paroxysm of pulsation in the head, and threatened apoplexy, is a pure arterial impulse, preceded by no sensible cause, and rising gradually to that heighth of excitement, in which the fulness, the resistance, the increasing distension of the veins, and accumulation of blood, oppresses the brain, and contributes perhaps to abate the action of the arteries. Sometimes this febrile apoplectic impulse lasts, with occasional interruptions, for many days: returns of the pulsation, fits of stupor, and intervals of quietness, succeed each other: the high arterial action, the confusion, headach, and drowsiness, the internal pulsation, which confounds all the senses, and seems to raise the head from the pillow at each stroke, is renewed from time to time. Sickness, and hiccup, and numbness of the limbs, headachs, drowsiness, and stupor ensue. We must watch continually for this beating of the temples, and inflation of the features, this heaviness of the eyes and senses, and that slow strong throbbing pulse which accompanies the attack. This congestion, if hurried on by emetics, instantly terminates in deep apoplexy; and if even it be but neglected, the organization of the brain suffers, exudation of blood takes place slowly, after a long fit of unrelieved stupor, the patient is awakened with a slight distortion of the face, his faculties are impaired, and during all his after life, he trails one limb, for the structure of the brain thus injured never can be restored. This is truly an arterial impulse peculiar to the vessels of the brain, and little connected with febrile or other states of

* "When apoplexy has once affected a person, in the advanced period of life, even if temperate in modes of living, it ought to be a *veto* against the use of all spirituous or fermented liquors. In such conditions of body, it is surprising how small a quantity of wine will induce stupor. A gentleman of my acquaintance was subject to *periodical apoplexy*, (for such I presume to call it, from the frequent attacks), for the last three years of his life. Such was the recurrence of this disease, that certain signs of plethora always indicated an approaching fit. From these premises, I often foretold to his relations the exact period of a new paroxysm. Some paralytic affection commonly remained after each attack, such as hesitation of speech, inability to retain his urine and stools, &c. This gentleman was now upwards of seventy, and had nothing besides that constituted the apoplectic make; he had been accustomed to much country exercise; and always very moderate in the use of wine; but now he could not take two glasses, without defect of voice and speech, and stupor coming on. Yet, in this situation, he had upwards of thirty distinct fits of apoplexy, the greater part of which I saw, and he died in one of them."—*Trotter*, p. 103.

the general ſyſtem; and we are no more to diſpute the viſible ſigns of this impetus of the blood towards the head, becauſe we know not why it ſhould produce apoplexy rather than delirium or madneſs, than we are to deny the high action of the arteries and congeſtion of blood in an inflamed part of the ſkin, becauſe we cannot diſcern what the eſſential difference is betwixt a pimple, a variolous puſtule, or a chancre or venereal ſore.

I have a ſtrong perſuaſion, that the nature or conſequences of this arterial action in the head is not underſtood, but confounded with the general impulſion of blood, from an accelerated circulation, without determination to the head, or, in other terms, without any unuſual action in the veſſels of the brain. "Determination to the head (ſays Dr Crichton) is not the cauſe of drunkenneſs or delirium, for this cauſe is not ſufficient to produce this ſtate on ordinary occaſions. We often (he remarks) have, in conſequence of violent exerciſes, a particular determination to the head without delirium." We have, indeed, from exerciſe, a heated body, and accelerated pulſe, and throbbing of the temples, but the pulſes of the head are not more violent than in other parts of the body; the one thing wanting is a particular determination to the head. "Beſides, (ſays Dr Crichton), there are many inſtances of people labouring under acute rheumatiſm, and pneumonia, whoſe pulſe beats 120 in the minute for ſeveral days, and yet have no delirium *." But it is not to be acknowledged, that often in acute rheumatiſm, or pneumonia, when the pulſe is thus hurried, and the ſyſtem in a febrile ſtate, there is delirium: What then is the difference in the two ſtates of the ſyſtem? Difference in the general actions of the vaſcular ſyſtem there cannot be, nor any riſing of the pulſe, for it can hardly exceed 120, except at the approach of death: what then can be ſuppoſed wanting in the one caſe, or peculiar in the other, but a determination to the head? What would be the effect of giving, (in ſuch a hurried ſtate of the circulation), an ordinate doze of opium, or ſpirits? What would be the effect of noiſe, confuſion, or paſſion, but to throw the patient into a paroxyſm of delirium? Theſe are the peculiar excitements to the blood-veſſels of the brain, and being ſuperadded to any febrile condition of the body, produce what is alone wanting, a determination towards the head. When a high pulſe, and febrile ſtate, is excited by bodily exerciſe, the head is clear; when excited by opium, wine, paſſion, or emotion, by blows, or injuries of the head, by febrile infection, or particular poiſons, by the burning heat of a tropical ſun, by any thing peculiarly calculated to excite the arteries of the brain, the firſt ſign of commotion is the throbbing of the

* Vol. i. p. 134.

temples, and confuſion of the ſenſes, while the febrile ſtate of the body is ſo ſlight as to paſs unobſerved. Impetuous exerciſes, or violent ſtruggles, running, blowing, coughing, aſthma, may drive the blood towards the head, and that with ſuch violence as to burſt its arteries; as in a diver, the blood often, in deſcending to great depths, burſting from the mouth and noſtrils. But if, while the body is quieſcent, the pulſe calm, the paſſions at reſt, and no unuſual, no viſible cauſe operating, there comes a throbbing of the temples, and confuſion of the ſenſes; if the arteries of the brain begin ſuch violent action, while other parts of the vaſcular ſyſtem are in ordinary action, then do we witneſs what is juſtly named a determination to the head; and Apoplexy, Convulſion, Palſy, or ſome horrible diſorder enſues.

With what ſudden unpremeditated violence ſuch impetus takes place, may be well exemplified in the caſe related by Drelincurtius. Under what title ſuch phenomena is recorded, whether the arterial impulſe only fills the head with blood, or burſts through the extreme veſſels; whether the patient is ſtruck more frequently with apoplexy, or falls down paralytic, or labours in convulſions, in conſequence of ſuch impulſe of blood, is not now an object of inquiry, ſince my whole deſign is to ſhew the ſuddenneſs of the ſtroke, and to illuſtrate what I have ſaid in a former page, that the arteries of the brain are ſometimes excited to inordinate action, as ſuddenly as thoſe of the cheek in bluſhing, or of the penis in erection.

"When I was firſt called, on Wedneſday the 7th of March 1664, (ſays Drelincurtius), to this young man, who was about eighteen years of age, I found him, lying without ſenſe or motion, the reſpiration and pulſe almoſt ſuſpended. I had often ſeen him, recollected his perſon, and learnt from his friends, that he was of a vigorous and athletic form, fleſhy, and full of blood, accuſtomed to live well, and habitually ſubject to bleedings from the noſe. He had that day dined plentifully, and having walked out about two hours after, was preparing to play a match at tennis; but, before he had begun to play, or entered at all into this violent exerciſe, he ſuddenly fell down, the blood guſhed from his noſe, his eyes were diſtorted, and ſeemed as if they would burſt from their ſockets; he vomited, and paſſed his urine and fæces inconſciouſly; he lay ſtruggling and toſſing his limbs, while the foam iſſued from his mouth; his voice, ſenſes, and reaſon, were gone, he gnaſhed with his teeth at thoſe who approached to help him. This was the relation that the keeper of the tennis-court, terrified at what he had witneſſed, gave to the friends: this was the firſt time this young man was ſo affected: this horrible convulſion came on without any external injury, or apparent cauſe.

" The young man (ſays Drelincurtius) being conveyed to his own bed, I was immediately called, and I found him ſtill vomiting, convulſed, grinding his teeth, and foaming at the mouth; his reaſon was diſordered, and the pulſe and breathing quick, but interrupted; yet for a little while it ſeemed as if this agitating ſcene would ceaſe. This proved a vain expectation; after exclaiming, Oh my head! my God! how has this come upon me! after being ſeized with ſeverer vomiting, and calling to his attendants and friends to ſtand aſide, he fell into convulſions, increaſing every moment in violence, and about ſix o'clock in the morning he expired.

" The firſt appearance of the corpſe was ſhocking, ſo livid were the head, neck, and ſhoulders, with the blood impelled into them; while bloody foam ſtill iſſued from the mouth. Upon opening the ſcull, we found the veſſels upon the membranes of the brain ſo turgid with blood, that though ſtill contained within its veſſels, it was coagulated into black knots, while the ſerum of this coagulated blood exuded through every pore and opening; and we found, and gathered up with the points of our fingers, ſeveral ſpoonfuls of effuſed blood, which, by the rupture of the ſmaller arteries of the brain, was extravaſated upon its ſurface, and inſinuated into all its convolutions and cavities. We alſo obſerved, (ſays Drelincurtius), that the blood was effuſed chiefly about the place of the mammillary proceſs, where it was not yet coagulated, though it continued after death to flow in a ſtream from the mouth and noſe."

In youth, while there is no prediſpoſition, no loſs of balance betwixt the arteries and veins, and in a caſe of arterial impulſe ſo ſudden as this, the blood has no time to accumulate, before ſome fatal accident happens: the apoplectic ſtate is never fully formed: the patient is convulſed, but not inſenſible. I ſhall be at no loſs to prove to you, by innumerable examples, how very ſlight the difference is betwixt the convulſed and apoplectic ſtates, that they are almoſt two ſtages or degrees of one affection; that convulſion might almoſt be named the apoplexy of boys and young men; that in youth, when the arterial impulſe is ſudden, and the veins as yet undilated, the patient falls down convulſed, the blood burſting thus from the mouth and noſtrils; the ſame impulſe, continued, renewed, leſs violent in degree, or leſs ſudden in its operation, produces complete apoplexy.

" A young gentleman, whoſe form and features marked him as prediſpoſed in a particular manner to this diſeaſe, died a very ſudden and dreadful death, at the age of twenty-two years. The peculiarities of his form were ſingularly expreſſive of this active and turgeſcent ſtate of the veſſels of the brain, in ſo much, that a phyſician, of ſtrong natural diſcernment, predicted this danger, while he was yet a boy.

His limbs were clean, ſlender, muſcular, and firm. The bulk of his body increaſed towards the ſhoulders, which were ſtrong, muſcular, and round, in ſo much as to give an appearance of ſtooping; his neck was extremely ſhort, his head large and round, his face flat and full, his lips and cheeks protruding, the neck and joining of the head, eſpecially about the angle of the jaws, fleſhy, and the temples, and thoſe parts of the head which in others are bony, were in him thick, plump, and cuſhion-like. Theſe peculiarities I was particularly called to obſerve, and I recollect them very diſtinctly.

" The arterial impulſe towards the head was, in this young gentleman, who was eminently diſtinguiſhed for talents and genius, of a febrile nature. If he ſpent a day in hunting, ſat in his wet cloaths, and drank, though but ſparingly, of ſpirits and water, he had a heavy headach, a ſuffuſion of the eyes, a puffing up of the face, and a full and throbbing pulſe. The firſt time this affection amounted to diſeaſe, was after a day of hunting, and hot exerciſe, at which time he fell down in a ſort of fit, and was in ſome danger of ſuffocating in a burn near which he fell. This, and one other paroxyſm, he concealed in kindneſs to his friends; but that it was of an epileptic nature, I know from this, that the third paroxyſm, which happened at the diſtance of ſeveral months from the ſecond, and which was the occaſion of my being called to him, was preceded by a flaſh or beam of light, which he felt while ſitting at his ſtudying-table, and the import of which he perfectly underſtood. This feeling alarmed him; he ſtarted up, ran into an adjoining room, and ſuffered a fit of convulſion not very ſevere. This was at the diſtance, I believe, of ſix months from his ſecond attack, was cauſed by the ſame ſlight errors, in hunting, ſitting in wet cloaths, and drinking in the evening a little ſpirits and water, in ſpite of the earneſt remonſtrances of his friends, although within the very ſtricteſt rules of moderation, in ſuch quantity as would have affected no other perſon. His convulſion was preceded by that heavy headach, which he dreaded as much as the beam of light. On the evening of the third day, while I was ſitting with him at the tea-table, and another gentleman of our profeſſion, his particular friend, and common attendant, in company, engaged in general and chearful converſation, in which our patient took his part with great hilarity, he roſe with apparent deliberation from the tea-table, turned round into the adjoining room, and, in a few minutes, when I followed him, I found him lying convulſed in the moſt dreadful paroxyſm I had ever witneſſed. His neck ſeemed inflated, his face black with blood, his eyes ſtarting from his head, his tongue ſwollen, and projecting ſo as to fill his mouth, his lips protruded, and actually black, and his whole body ſtiffened with convulſion, but neither ſtruggling

nor diſtorted. We inſtantly bolted the door, to prevent uſeleſs alarm; untied his neck-cloaths; his friend and his ſervant ſupported him; and I bled him from the arm ſo profuſely, ſo ſuddenly, and from ſo large an orifice, that the moſt vigorous man in health muſt have fainted under it. Inſtantly, and before I thought it neceſſary to ſtop the blood, his convulſion relaxed, his face reſumed its natural colour, he opened his eyes, and knew us; in a few ſeconds, he was able to mutter a few words: Yet, for a quarter of an hour, he lay in a ſtate of torpor, ſenſible, in ſome degree conſcious of the ſcene around him, able to anſwer, but unwilling to be rouſed.

"He was thus ſaved from the conſequences of a paroxyſm, which, had it been permitted to laſt, would, I am perſuaded, have ended in effuſion into the brain, with palſy, or irrecoverable apoplexy. The bliſters over all the head, the iſſues in the neck, and the draſtic purges which were ordered in a general conſultation, reſtored him to apparent health. Some laxative medicines were preſcribed, to be uſed from time to time; but I ſhall ever regret, that the wiſhes I repeatedly and earneſtly expreſſed, of having him ſent to a watering-place, purged for months with ſaline waters, limited to the ſevereſt regimen, reduced in his whole habit, and kept ſo during all the earlier part of life, were neglected. It is in vain to ſay ſuch diſorder is nervous, that we hope it will not return: ſuch arterial impulſe, having once taken place, will infallibly return: having once exiſted, the prediſpoſition muſt, through life, continue to exiſt: it is never, after it is once declared, to be treated as a thing unknown, or only ſuſpected. The patient who wiſhes to live in ſafety, after ſo awful a warning, muſt live by rules the ſevereſt, and moſt mortifying. "Nullus eſt morbus, quem diu ante facilius præſagire poſſis, nullus quem adultum difficilius expellas. Indeſinenter ergo ſuadere deberent medici, periculum in quo conjicit ignavia, circa leves illos paroxyſmos apoplexiæ prodromos. Præcavetur facile, raro integre ſanantur *."

At the diſtance of nine months from this dreadful attack, after living a very temperate and abſtemious life, guiltleſs of every error, but that of ſevere application to ſtudy, the ſame ſlight irregularities excited again this dreadful impulſe of blood towards the head; for a few days he had complained of that portentous pain, weight, and fulneſs within the head, which had preceded each former attack; and his medical friend bled and purged him, by way of prevention, and enjoined abſtemiouſneſs and quiet. He went a-ſhooting, and ſat in the wet cloaths in which he returned;

* Tiſſot, p. 23.

drank a little ſpirits and water in the evening, and next night he ſupped abroad, in ſpite of every remonſtrance, drank with all round the table of a weak white wine, which he ſuppoſed little heating, (ſo very ſlight are the cauſes to which the moſt diſaſtrous conſequences may be referred): Next day, he felt the coldneſs and ſlight ſhiverings, which indicated always the approaching paroxyſm. He was alternately hot and cold; his eyes ſuffuſed, as if injected; his face turgid, with the uſual pained, heavy, and confuſed feeling within the head; and along with theſe ſlight ſhiverings, he had as uſual a full and throbbing pulſe, very different from its natural and quiet ſtate. Next day, when his brother went to call him, in the morning, he found him complaining of headach and confuſion, and he ſaid, (conſcious of his confuſed ſtate), "Surely I muſt have been unwell during the night." All that day his face was particularly turgid, his temples throbbing, and he had frequent irregular and convulſive twitches: On the ſecond morning, he was inſenſible. It never could be aſcertained, whether on either of theſe days he had ſuffered any degree of convulſion. That he had ſuffered an epileptic paroxyſm, is not to be ſuppoſed, for his tongue was not ſwelled nor injured. But the impulſe towards the head had been ſlowly and regularly increaſing; he had not been bled; leeches only were applied to his temple, a ſlight and trivial evacuation, God knows! and altogether diſproportioned to ſo dangerous a ſtate of the circulation in the head *. He lay now quite comatoſe; his head ſeemed ſwelled with the congeſtion of blood; his eyes were ſuffuſed, and but half open; he had a frequent catching, and twitches, as if his whole frame had been agitated by a ſlight convulſion, but no paralyſis, except of the tongue; he lay extended, generally inſenſible, except when rouſed; his head fell always down from the pillow; he muttered and talked very indiſtinctly; when rouſed, he became more ſenſible, but preſently relapſed into a ſtate of torpor: When importuned by his friends, or when aſked, whether he knew his attendants? he replied with an inclination of the head, and an indiſtinct grunt, as of aſſent. When aſked, Will you take a little of this drink? he uſually anſwered, Yes, in a very ſhort and hurried manner, and took the drink when preſented. He lay in a ſtate of almoſt continual torpor; the longer his ſlumber was of being interrupted, the convulſive twitches, though ſtill ſlight, ſeemed more frequent. From the moment of his falling into this apoplectic ſtate, he never ſpoke diſtinctly, could never be rouſed but for a moment: his ſlumber and ſnoring became every hour heavier and deeper; he became gra-

* I was called: Dr Monro, who had formerly viſited him, and been of the conſultation, was alſo called, but we were abroad: His particular friend and regular attendant was alſo moſt unfortunately from home.

dually more inſenſible, and without any involuntary evacuation of urine, or fæces, expired on the fourth day.

DISSECTION.

"THESE are circumſtances in which we might have predicted, that the pure apoplectic ſtate would prevail; that there would be found inflamed membranes, and dilated blood-veſſels, but no extravaſation into the cavities or ſubſtance of the brain. The veins, upon raiſing the dura mater, were found uncommonly turgid with blood; the pia mater extremely red, vaſcular, and ſeemingly injected; the medullary ſubſtance of the brain was not, as in its natural ſtate, white and cineritious, but actually red, as if delicately injected with ſize, and the bloody points marking the ſections of its blood-veſſels extremely numerous and large. Upon cutting the hemiſphere, layer after layer, till a thin and tranſparent roof only was left covering the ventricle, there iſſued, upon puncturing it with a bleeding lancet, ſeveral ounces of ſerum, clear and watery, and but very ſlightly tinged with blood; all the little arteries which ply round the optic nerves, and cover the baſis of the brain, were red, turgid, and as if ſubtilly injected. The appearance moſt remarkable and ſtriking, was the univerſal redneſs of the ſubſtance of the brain; the inflamed colour and appearance of injected veſſels was ſtill more conſpicuous over all the baſis, than on the upper ſurface of the brain. There was no where the ſlighteſt appearance of extravaſation or bloody effuſion, either by laceration or by anaſtomoſis, *i. e.* from dilated extremities of the arteries."

This ſudden arterial action I will illuſtrate with one inſtance more, the caſe of a gentleman well known in our profeſſion, who, from a ſpirit of enterpriſe and public duty, embarked with Lord Elgin on his embaſſy to Turkey, with the deſign of inveſtigating the nature of the plague, and of reforming the quarantine laws *. "This gentleman inherited a marked tendency to this diſeaſe, of which his mother and ſiſter died †. He was of an athletic form, of a full habit, of coarſe ſkin, and

* Dr Hector M'Lean, Author of "An Inquiry into the Nature and Cauſes of the Mortality of the Troops in St Domingo," where he performed his duties, I am ſure, with good ſenſe and zeal, and lived in a manner ſo hoſpitable, kind, and good, that I find his fellow-officers ſpeak of him with reſpect and affection.

† Wepfer ſays, "Norunt omnes expertes Philiatri, apoplexiam eſſe ex illorum morborum genere quos hereditarios vocant, et qui a parentibus in filios charactere ſeminali propagantur, ita ut certe ſtemmati fatales eſſe, aut ita natos diſponere ſoleant, ut eidem morbo magis ſint obnoxii." Forreſtus relates a caſe of apoplexy in one, whoſe father and all his brothers had died of the ſame diſeaſe.

florid complexion, of ſtrong natural abilities, and addicted to the pleaſures of the table, to good fellowſhip and wine: the prediſpoſition was, in every circumſtance of his perſon and habits, ſtrongly marked: in every variety of climate, in the Eaſt and in the Weſt Indies, he had always lived very full. During his voyage to Conſtantinople, in the ſuite of an ambaſſador, and ſurrounded with every luxury of the table, without a motive for even his uſual exerciſe, and with incitements to indulgence from which he was ill able to refrain, he "made much blood," and was conſcious, that on his arrival in Turkey, his ſyſtem was in a dangerous ſtate of plethora, marked by a torpor, liſtleſſneſs, ſickneſs, and manifeſt determination of blood to the head, with frequent hemorrhagies from the noſe. On the 2d of November, after a voyage of ſome weeks, he arrived at Conſtantinople, and continued in tolerable health till the month of February, when he was ſenſible at once of unuſual torpor and ſevere ſickneſs; his appetite entirely failed; after every meal ſickneſs and torpor enſued; he was ill till he vomited, and then he fell into a profound ſleep. Though conſcious that his faculties of every kind were greatly impaired, he was yet unconſcious of the extent of his danger, unmindful of his hereditary prediſpoſition to apoplexy, and ſlumbered on without reforming his ſyſtem of life, without betaking himſelf to needful exerciſe, or uſing the ſalutary and neceſſary evacuations of bleeding and purging: he continued, in ſhort, to live luxurioufly, to eat, drink, and ſleep, abundantly, till he fell into a febrile apoplexy, of which every preceding day may be ſaid to have been a leſſer paroxyſm, the blood ſtill accumulating from natural and irreſiſtible cauſes.

"Towards the end of February, or early in March, his faculties were quite obſcured; he loathed his food; he rejected it with ſickneſs and nauſea; he felt unfit for exertion, forgot what he read, and had a perpetual lethargy. When he firſt, after ſitting long, began to walk, he was ſenſible of a heavineſs in the right leg, but ſtill he was not alarmed.

"On the 16th of March, when preparing to accompany Lord Elgin to dinner at the Auſtrian Ambaſſador's, he was ſeized with a violent hiccup and vomiting, which unhappily he tried to appeaſe with wine and opium, but found it ſuch as nothing could reſtrain: The blood was now propelled towards the head in a great volume; as he lay in bed, the pulſes in his head ſeemed to raiſe it from the pillow, and jarred his whole frame at every ſtroke. Dr Wittman, of the artillery, who was called to his aſſiſtance, did not bleed him in this critical moment; he laboured

all night with this hiccup, and lay in great misery from the violence of the pulsations, and the conviction that he should have been largely blooded.

"In the morning, Dr Wittman was again called, who consented then to bleed him; and his pulse, in place of being abated, sensibly rose in the strength and frequency of the strokes: it throbbed fuller and stronger: though he had lost sixteen ounces of blood, he still felt the heavy and throbbing pulsations in the head, and counted them by the ear more distinctly than at first. Towards evening, he fell into a profound apoplectic sleep; he lay buried in this stupor all night; he was roused in the morning with great difficulty; he was paralytic; his leg and hand of the right side lay powerless; his tongue was affected; he could not speak; he felt a peculiar sense of numbness all around the right side of his jaws, as if in the teeth.

"Not the most profuse evacuations could now prevent the consequences of that injury which the brain had already suffered, yet what was now done too late to prevent the palsy, contributed to save his life. He was bled daily during ten successive days, to the extent of twelve ounces; during all that period, he heard distinctly each stroke of the arteries within his head; but gradually this diminished, and he was left to feel all the misery and languor naturally resulting from the irreparable injury which the organisation of the brain had sustained. His memory and all his faculties seemed to fail him; he forgot names entirely, and remembered nothing but what he was guided to by the most direct association; his tongue recovered; the numbness of the thigh vanished; but his leg and arm continued palsied, so that, though he could walk, it was very lamely, and he could not write. Dr Wittman, whose kindness was now a great solace to him, blistered and electrified the palsied limb, but without effect; he enjoined a spare diet of vegetables, and an almost total abstinence from wine. During six months he languished in this condition; his appetite was gone; his rest forsook him entirely; and in despair, he sought relief from opium, taking it more profusely than the most debauched Turk, for he increased his evening's dose to 500 drops, which completed his ruin. It was an act of despair; his judgement was weakened, his constancy of mind quite subdued, and he could not refrain from what gave relief; he lost the power of retaining his urine; he was in a state of constipation continually; and often he rose in the morning with the tremors which follow a debauch. He tried the warm baths of Constantinople, and, at the suggestion of his friends, went to try those of Brusa on Mount Olympus, where, by using the bath too hot, and every day,

he, during the ſix weeks that he remained there, got daily worſe. Every thing, he is now conſcious upon recollection, tended at this time to ruin utterly his nervous ſyſtem; he ſtill, though under a ſtrict regimen, and with an impaired appetite, made much blood, and continued to ſtimulate his brain with opium, and rarify his blood by the hotteſt baths. Conſcious of being very full of blood, he required Dr Stuart, phyſician to the expatriated family of Stuart, to bleed him, which was done repeatedly, about ſixteen times during his reſidence at the baths.

"After ſojourning at Smyrna, Rhodes, and Malta, and having touched at Gibraltar, he took his paſſage home, and arrived in that ſtate of health from which it was not eaſy to look for a perfect recovery. His diſappointments in all thoſe remedies which friends or books have ſuggeſted to him, need not be enumerated: the precautions and reſtrictions ſuggeſted by Drs Rutherford and Monro, joined with me in conſultation, relate only to that plethoric habit, which is ſtill ſo ſtrongly marked in Dr M'Lean's conſtitution; our chief anxiety has been to ſave him from future attacks, or further injury to the brain."

The ſlighteſt ſketch of an affection of this very peculiar nature, the ſlighteſt intimation of the courſe of a violent arterial action ruining the organization, ſhould ſurely put a ſtop to the outcry againſt bleeding, and to the uſe of ſtimulant drugs. The phyſician who knows the peculiar ſigns of this arterial action within the brain, and is aware of its danger, will allow no bliſters to be applied in the moment of attack; no emetics, no opiates, no wine, no warm drinks; no ſudorifics, which are univerſal ſtimulants, accelerating the circulation through the whole frame; no emotions of the mind; but will enjoin quiet and coolneſs, refrigerative applications to the head, antimony and calomel calculated to ſicken and to purge, and will ſet no bounds to the uſe of the lancet, but the duration or violence of the arterial action; his remedies will be boldly and deciſively adminiſtered, till that action be ſubdued, and his care and watchfulneſs unremitting, leſt it ſhould return.

On theſe points, the leſſons I have laid before you muſt be perſuaſive; nor can it require any proof, that the apoplectic ſtate is a ſtate of excitement, and high arterial action in the veſſels of the brain. Yet I am not unwilling to add to my deſcriptions what I might almoſt call a definition by Burſarius, ſo conciſely does it expreſs all that I have imagined or deſcribed of the ſtate of the whole ſyſtem. Burſarius ſeems to have been doubtful whether the arteries of the head could be excited ſo ſuddenly as to cauſe the apoplectic ſtroke. Unwilling to attribute effects ſo

sudden to a direct excitement, he has imagined, like Cullen, that a spasm might be interposed to explain a fact he could not deny. Bursarius seems to imagine that when from passion or emotion, from anger or terror, a man is struck down, his system is thrown into a spasmodic or convulsive state, whence apoplexy is produced *: Yet every circumstance, even in the approach of such apoplexy, as described by Bursarius, imports its febrile nature: "Its approach is announced by cold extremities and a burning skin: the face and eyes inflamed, the carotid arteries beating quick and strong, while all the pulses of the body throb powerfully †."

Let us then observe the patient in this state of approaching apoplexy, by far the most frequent, and fortunately the most curable: for the apoplexy of old age, proceeding from dilated veins, imperfect absorption, a circulation in the brain habitually difficult, and a consequent effusion of serum, a torpor gradually increasing, in which, when we dissect the body, we hardly know to which cause to ascribe the death, whether to veinous congestion or serous effusion, is extremely difficult to cure. The man struck with the sanguineous apoplexy of Senertus, if he has been attentive to his feelings, has been conscious of a beating of the temples, confusion of head, and subsequent torpor. His first feelings are headache, confusion, and a loaded feeling. There is a violent throbbing of the temples, while a degree of sickness accompanies the headache: but, when the pulse begins to beat slow, heavy, and oppressed, and the confusion of head is changed into torpor, the apoplectic state is begun.

This is the CAROS, the APOPLEXIA MINOR, APOPLEXIA LEVIS, of Hippocrates; the slighter or milder apoplexy: in which the impulse is slight, the texture of the brain no way injured, and the accumulation of blood not irrecoverable: but the patient who is struck with the APOPLEXIA FORTIS, the DEEP APOPLEXY, lies buried in a deep lethargic sleep, from which he cannot be roused; his mouth is half open, while frothy saliva bubbles from it at every breath; his face is purple and dark; his eyes staring like one in the moment of suffocation; his nostrils dilated; his mouth swelled; his lips protruded, and his breath is delivered with unpremeditated bursts from the lips, and a snoring noise from the nostrils: his breathing is slow and heavy; his pulse full and big, and very slow; his face agitated

* Proximum est, ut de signis apoplexiae convulsive seu spasticae quae nimirum a spasmis originem ducit, disseramus. Huic obnoxii sunt qui hypochondriaca vel hysterica fussione subitisque animi motibus, ira terrore aut epilepsia vexantur, &c. page 84.

† "Simul ac in propinquo est, extrema perfrigerentur, cutis arrescit, facies oculique rubent, arteriae carotides validius celeriusque micant; reliquae magnum durumque pulsum exhibent," § ciii.

sometimes with twitches, which distort the mouth, and his limbs sometimes disordered with slight irregular convulsions; his temples are bedewed with a clammy sweat; his feet cold; his limbs are more commonly paralysed and relaxed. As the oppression advances towards this degree, he may be roused: then he stares wildly about him, answers with a monosyllable or nodding of the head; often stirs his limbs as if under sensible oppression, and lifts his hand as if to relieve his head. When the deep apoplexy is come on, the face is deep purple, (atro-rubens,) and the breathing strongly stertorous: no excitement can rouse the patient to motion: his eyes are fixed and staring like a strangled person's, or half closed: he may be turned, pinched, or even cauterised, without his showing any sign of sensibility; he lies along, heavy and motionless, like a log: if he is to revive, he struggles more; he looks about him wild and delirious; he seems to know his friends, and swallows what is put to his lips: but if he is to die, his deglutition is more difficult; he suffocates when you pour any fluid into his mouth; his extremities grow colder; his pulse slower and feeble; his face becomes pale and contracted; he passes his urine and faeces involuntarily, and expires.

From various degrees and kinds of torpor, which shall by and bye be defined, this the true apoplexy is distinguished by certain pathognomonic signs, the succession of which is very particular: by a deep torpor and loss of sense; by stertorous breathing; a slow pulse; and relaxation of all the body. What is this stertorous breathing which distinguishes true apoplexy? It is the consequence and the sign of all the senses being oppressed, and all the vital motions injured, and is the same in apoplexy where the brain is universally gorged with blood, as when the neck is broken by a fall, and the man lies paralytic of all the body. By the impetuous course of the blood towards the head, the face is turgid, while internally the substance of the brain is compressed: by the compression of the substance of the brain, the body becomes insensible, so that it may be cauterised without shrinking, and all the limbs and joints are relaxed and extremely flexible: The vital functions of breathing and circulation are also slow, owing to compression of the brain; thus, in fractured scull, the depressed bone or extravasated blood is taken away, the pulse rises, and the respiration becomes free at the same moment that the patient opens his eyes and stirs his limbs. The breathing is stertorous or noisy in the true apoplexy, because the lips, being paralytic, are collapsed and fallen together, and swelled along with the other features by the general afflux of blood, is the reason of each respiration being delivered with a sudden burst, the swelled lips being opened by each impulse of the slow, heavy, and irregular respiration: and as the stertor is the peculiar

and pathognomonic sign of apoplexy, by the degree of stertor are we to judge of the degree of oppression. "Stertor est caeteris paribus mensura periculi," (Sauvages.)

Palsy of one side is supposed to be favourable to the patient's recovery, only because it appears when the patient recovers: it is the effect of bursting among the smaller vessels within the brain: when such ecchymosis is large, and the brain much injured, the apoplexy grows deeper, and the patient dies; but when less extensive, he survives, and survives paralytic: The distortion of the mouth, or the paralysis of one side, can only be observed when the senses are restored, and the other side begins to move: but when we observe carefully the patient, who lies in a deep apoplexy, we can perceive that one side lies very still while the other is slightly convulsed. Palsy, implying an effusion of blood into the substance of the brain, may be so slight as not to prevent recovery, and to appear only when the senses and feeling are restored; it may even have some relation to the cure, to the conclusion of the apoplectic paroxysm. But it is, I believe, a universal fact, my experience in fractures of the scull at least instructs me so, that wherever there is distinguishable paralysis, or strong convulsion during the apoplectic state,—wherever the sphincters of the rectum and bladder are relaxed, and one side is convulsed while the other is palsied,—the patient dies.

Apoplexy is a dreadful, almost incurable, disease. That it is a disease, not of high excitement of the nervous power, as is usually said, and exhausted excitability, but of impetuous action of the arteries, is beyond dispute: though nothing of the predisposition tended to prove this, all the intermediate causes, and even the scene in which a man is struck with the apoplexy, would put this beyond any doubt. That it should be an irrecoverable disease *, must seem natural to those who foresee the consequences of such impetuous destructive circulation in an organ not supported when in a state of suffering, nor capable of being restored, by the healthy circulation of adjoining parts, but in whose disorder the whole body partakes, by whose diseases all the vital functions are affected. When the circulation of a limb is powerfully excited by injury or spontaneous disease; when the whole member throbs with pulsating pain, and reddens from intense circulation, a cellular effusion comes on, which moderates, checks, and represses that high arterial action, and leads to resolution; unless, indeed, the extravasation be so great as to cause gangrene. But in the brain, the mere fullness of vessels

* "Omnis Apoplexia Sanguinea et Apoplexiam fortem tollere ut plurimum est impossibile."——*Sauvages, Classis VI. Debilitates.*

oppresses its function, even before effusion takes place; and the slightest degree of effusion added to that oppression, causes paralysis of the whole body, and lessens the pulses of the heart, and the play of the lungs; thence the stertor, and all the mortal phenomena of apoplexy.

Excitement alone, as the stimuli of passion, wine, or opium, causes a temporary apoplexy; but predisposition is necessary to constitute it a fatal disease. The excitement, even from any one of these stimuli, presents to us all the phenomena of apoplexy. Intoxication is an epitome of all the stages of excited action and vascular congestion; but being in a sound organ, not predisposed, it ends not in apoplexy, but in recovery, less perfect indeed at every renewed debauch, and attended, even at the best, with giddiness and disorders of the head, trembling of the hands, low spirits, and a disordered stomach: but, conjoined with other excitements, or, in a predisposed system, intoxication ends, like apoplexy, in palsy or death. The first effects of wine are hilarity and mirth, pleasurable sensations, lively conceptions, unusual and brilliant combinations, unpremeditated flashes of wit, and merriment, to set the table in a roar; till laughing, singing, howling, and all the delirium of drunkenness succeeds. In the next degree, are jealousies and quarrels causeless and inextricable; threats, reproaches, imprecations, "Swords out, and tilting at each others breasts, as if some planet had unwitted men;" till excitement ends in torpor, stupidity, and temporary palsy: Then the intellect, the senses, the muscular powers fail; the pallid and distorted features, the staggering gait, the paralytic dangling of the hands, the babbling and hesitating speech, betray the state of the sensorium. "Seen dim and blue, the double tapers "dance, like the sun wading through the misty sky." "Their feeble tongues, un-"able to take up the cumbrous words, lie quite dissolved;" till, overpowered, the drunkard sinks down, and all the scene is buried in oblivion: he lies in profound insensibility, in a sleep almost apoplectic, with snoring and stertor; the face is bloated and swollen, the pulse oppressed and slow, and if he dies, he dies apoplectic, with the vessels of the brain gorged with blood.

That apoplexy does not always ensue, proceeds from want of predisposition, and from the determination to the head being limited by the temporary nature of this excitement: But frequent excitement, and arterial action often renewed, begets at last veinous congestion and serous effusion; hence drunkenness produces that predisposition, the absence of which makes the first indulgence in some degree safe: the headaches and the debilitated stomach are from congestion of blood and increased effusion, whence the cavities of the brain are enlarged; the trembling hands and tottering limbs, and emaciated frame of the confirmed drunkard, show the degree in which

the brain has suffered; and daily excesses confirm the organic disorder, and lead to palsy, to premature old age, to second childishness and mere oblivion.

The paroxysm of furious intoxication is thus succeeded by accummulation of blood within the head, and apoplectic oppression; if other excitements of heat, noise, lights, passionate declamations, quarrels and reconciliations, temporary interruptions of intemperance, and renewed debauches follow; if, after the highest state of excited circulation and incipient oppression, the person is tumbled into a carriage, lies there in a distorted posture, and is driven for miles furiously by servants, drunk as th eir lords,—complete apoplexy ensues *. Nay, independent of any very particular cause,

* How very often soldiers, sailors, and labourers, are found lying under a wall apoplectic, and dying from pure intoxication, need hardly be told. Carters and others, who get into their carts, and are rumbled along a rough pavement, in crooked postures, with their heads declining and their necks crooked, are often taken out by their friends apoplectic and dying. "I remember (says Shenkius) many such deaths. A merchant, having dined at a village not far from Alkmar, was tumbled, drunk and grunting like a sow, into the bottom of a boat; where the boatman, as drunk almost as his passenger, left him lying on his back, and believed him in a sound sleep; but when, having arrived at Alkmar, he stirred him, and wanted him to rise and get out, he found him dead." "Two brothers returning very drunk from the fast at the Hague, the one lay on the other's breast, and snored, so that all the other passengers in the coach, believed him to be sound asleep, though he did not answer when spoke to, nor seemed to feel the extraordinary velocity with which they were whirled along; for the coachmen, (who take the privilege at such times of being as drunk as those within), had laid the reins on the horses necks: this man, who was of a coarse full habit of body, was carried into his house in a state of insensibility and stertor, and died before his family could call for help." "At another time, the driver from Alkmar to Harlem being very drunk, the company tumbled him down into the back of the waggon, and set another fellow to drive; but, when they arrived at Harlem, they found him dead, though they had heard him snore."

The frequency of apoplexy in Holland has been imputed to their moist and cold climate: I fear it is rather to be imputed to that which they regard as the best preservative against the moisture and cold. In short your Hollander is too well acquainted with Corporal Trim's doctrine of the radical heat and the radical moisture; the Corporal considered the radical moisture to be the ditch-water, and the radical heat, by which it was to be expelled, as right Geneva.

Interim memini quendam Simonem Barbrandum, quoque Alchmarianum, qui mercaturae causa frequenter Coloniam proficiscebatur, à potu convulsum periisse. Hic autem cum in pago non procul ab Alchmaria urbe patria mea, egregiè potasset, ac in scapha vino oppletus, porcorum more stertens, in dorso jacens, domum veheretur, nauclerus etiam ebrius existens eum dormire ratus est. Verum cum Alchmariam appulisset, ut ex scapha exiret, et nauclerus eum alloqueretur, et diu dormientem (ut existimabat) arriperet, hominem praeter exspectationem mortuum invenit.——*Forestus Schol. ad observat.* 27. *lib.* 9.

Ex ebrietate convulsi, et subito mortui.—Petrus ille Jacobus Delfius, vir admodum crassus, qui ad partem urbis orientalem habitabat, anno 1563, cum in Haghensi dedicatione (in qua more solito Bac-

such a life is attended with too many shocking varieties, not to have often a dismal, disgraceful, conclusion ; often, in some fit of apoplectic torpor, and just before the vessels cease from their high action, they give way, and, after lying buried in an apoplectic sleep, the drunkard, when roused by his friends or servants, wakens difficultly, imperfectly, with a confusion of the senses, a wildness of aspect, a faltering of the tongue, and distortion of the mouth ; and though he partially recovers, he ever after trails the limb. The first excitement of intoxication is delirium ; the succeed-

chus colitur) vino repletus portuque obrutus, curru ab Hagha Delfos veheretur, in sinu fratris etiam ebriosi decumbens, supraque dorsum jacens sterteret, ita ut caeteri omnes una in curru existentes ac ebrii ipsum profundo dormire putabant, licet ad interrogata non responderet, nec motu illi citatiore expergisceretur. Vehebatur autem celeriori cursu, laxis equorum habenis ab auriga, cujusmodi homines tunc plerumque etiam ebrii sunt, et sicut mutus ad domum perveniens, et ad eam vix allatus, in stertore permansit, ac subito convulsus periit, antequàm ego et Cornelius Heydius, collega meus acciti, ad eundem pervenissemus, quem mortuum deprehendimus. Vino igitur repletus stertore suffocatus est, quanquam crediderim vectionem illam celerem, ad mortem juvisse subitaneam, cum ita dorso incumbens jactaretur.

Idem evenit cuidam Aurigae Alchmariano, *Joanni Brant*, qui cum ebrius esset, et currum (ab Alchmaria Harlemum proficiscens) regere non posset, eundem sic ebrium in partem currus posteriorem abjecerunt, et alius currum rexit. Verum cum Harlemum appulissent, aurigam supra dorsum jacentem mortuum invenirunt, quem tamen antea stertentem audiverunt. Si vero praesentes utrumque neglectim non habuissent, et in latus volutassent, forte uterque in vomitum incidissent, nec ita subito extincti fuissent. Prior autem antequam in curru suffocaretur, alvum reddiderat, se ignorante ac seipsum confœdaverat : utrumque ex violentia mortis praeoccupantis, haesito.

Those who are poisoned by opium die apoplectic, as also those who die from the excessive use of tobacco, or any other narcotic.—" Two Silesians, brothers, having laid a wager on a subject, (as idle as that of the two boys about sneezing,) viz. which should smoke the greatest number of pipes of tobacco ; they both dropped down apoplectic, and died ; the one after the 17th, the other after the 18th pipe.

Nota est historia duorum fratruum Silesiorum, qui, cum se provocassent ad fumum tabbacci hauriendum, praemio proposito illi, qui diutius perdurasset, ambo perierunt apoplectici, primus ad decimam septimam tabacci fistulam, alter ad decimam octavam.

Those who die of opium, die apoplectic ; examples of which to be found in the Medical Essays of Edinburgh, and in Sauvages.

Stupor mortalis ab assumpto Opio.—Cum nobilis quida podagricus, summis cruciatibus affligeretur, nosque medici illi adessemus, insciis nobis, empiricus impostor, opium illi propinavit, quo sumpto, cum mox ea nocte dormiret, adeo valido sopore pressus, ut et sterteret, gavisa primum uxor, quod de dolore non amplius conquereretur, mox vera eum totum stupidum observans, qui et impulsus, non e somno illo profundo excitabatur, nos excitavit, quem accedentes, in agone mortis, summe calentem, et sudore frigido interim madentem, deprehendimus, sicque extinctus est.—*Platori Ob.* p. 16.

ing stupor is apoplexy of a shorter duration ; and the tremors which follow are a slight but universal palsy.

The Apoplexia Temulenta is imperfect only from want of predisposition, and temporary because the excitement soon expires. Where the true apoplectic stroke takes place, all incitements naturally tending to hurry the circulation co-operate at once, and the very scene, and the early feelings of oppression, might warn the person of his danger.—The sufferer is usually in the prime of life, or little past it*, of a strong and athletic form, a full habit, a ruddy countenance, of powerful appetites, accustomed to the pleasures of the table, and given to wine. He is seated at a feast, in rooms crowded with company and servants; the lights, the noise and confusion, the vociferous conversation, are oppressive to all but those who are accustomed to such a scene, and would produce, independent of any higher excitements, headache from hurried circulation: close pent up in such a circle, he begins to indulge in high seasoned dishes, and each service is accompanied with brimming bumpers of generous wines, dangerous at any time, and now poured down without reflection, without stint or measure. To this scene succeed the vociferation of toasts, the contention and ardour of conversation ; bumpers are still poured down upon a distended stomach, which, by its expanded state, exposes a wide surface to the operation of the excitement ; which, both by the nature of the exciting powers, and the contentious and noisy scene of this indulgence, is particularly determined to the head. The person feels, at last, his pulses throbbing, his eyes dazzled, and his senses in confusion ; his neckcloth and clothes begin to be oppressive ; he feels the torpor grow upon him ; he draws his breath with difficulty ; and, with an inflamed visage and confused head, he rises to escape from the heat and oppression : he drops back upon his chair ; tries to rise again, and falls sidelong from his seat in a state of stupor : his extremities are cold ; his limbs relaxed ; his pulse slow and heavy ; his face purpled with congestion of blood ; his breathing stertorous, *i. e.* slow and oppressed, and bursting with interrupted and noisy explosions from the lips and nostrils. This state being mistaken for intoxication, (as who can distinguish it,) he is dragged away by servants, and rolled into bed ; his pillows are disordered ; his head lies low, and his neck is distorted ; his breathing, naturally difficult, is half suppressed by the posture in which he lies : he snores loud and deep, and in the morning is found in

* Apoplexiae fiunt maxime a quadragesimo ad sexagesimum aetatis annum.—*Hippocrates, lib.* ii. *De Morbo Attonito.*

a state of irrecoverable stupor; if he is at all capable of being roused, he only stares, but cannot speak: his mouth is covered with foam; his face distorted; his limbs quite relaxed; the pupil of the eye dilated: he groans; his extremities become gradually colder; he passes his urine and faeces involuntarily; and dies often in forty-eight hours.

If I have in the cases which I have just narrated, or in this general view, represented truly the nature of this arterial impulse, how impetuous the rushing of the blood towards the head, and how visible the signs of it, you may easily imagine how much a physician, who really understands the momentous and perilous condition of the patient, will be alarmed lest the organization of the brain should suddenly give way: lest some more delicate vessels should burst, and the patient be struck, perhaps in the very flower of his age, with irrecoverable palsy. To prevent the volume of blood, driven so impetuously through the brain, from destroying its structure, he instantly sets the patient upright, and bloods him profusely from the jugulars, and is sensible that the pulse rises as the blood flows: often the patient, in the moment of bleeding, opens his eyes, stares, breathes more freely, and begins to move his limbs; the pulse continues to rise in strength and become more frequent as the blood flows: in the evening he again draws away more blood. He thus saves the organ from utter ruin, and does not fear to repeat his bleedings, till the senses are restored, and the pulse, from slow, full, and throbbing, becomes light, frequent, and soft; and he thus, by profuse bleedings, prevents debility and palsy.

While I advise that sudden depletion which the occasion plainly requires, I will not involve myself in polemical discussions, but represent to you plainly the approved practice of the most celebrated men of all ages. And I will venture also to warn you against giving ear to the enthusiasm of mere metaphysical physicians, who neither know, nor care to know, the structure and mechanism of the body; who talk of exhausted excitability or of disordered sensorial powers, without acknowledging the physical disorder by which the sensorial power is injured. I will also remind you, that such enthusiasts there have been in all ages, whose theories have suspended the opinion of the profession for a time, which yet, has uniformly returned to that practice which sense and nature dictate. Those of the present day who decry bleeding should be abashed were they told how expressly they are repeating the insipid declamations of the 16th century, "prétendant que c'est un abus de saigner dans toutes sortes de maladies, est que c'ést égorger un malade," &c*. "There are now (says Dionis) and have been in all ages, carpers against this important remedy; men who,

* Dionis.

to make themselves a name, declaim against bleeding" *. Such men arise from time to time: Among others, one appeared about twenty-five years ago in this city, whose efforts, like those of other inventors, served but to destroy prejudices and prove the usefulness of bleeding. His name was Demascene, a good looking man, of an open countenance, and well dressed in the character of a physician, and abundantly impudent. He began with condemning bleeding, affirming, that " to bleed was to commit murder, robbing the person of blood, the very treasure of life: and, next, he explained how the moon presided over human bodies; that by its phases were we to judge of diseases; that by giving his opiates, antidotes, and elixirs, at the just period of the moon, he cured with equal success all kinds of diseases." These were the new principles which he recounted in a printed book. A declaimer such as this could never want admirers, since novelty will ever have its followers, especially among those of higher rank; but his successes being but ill proportioned to his boasting, and the King (whom he had haunted at his public dinners,) and the Queen (whom he had constantly beset at her tea drinkings) being but too well informed of both the ignorance and impudence of his pretensions, gave orders that he should be dismissed the court; a commission so gratifying to those who procured it, that the command was executed in quite a royal manner: " Two Sheriff Officers took him very quietly one morning along, to the distance of three miles, from St Germains; and having privately escorted him so far on his way, gave him, on leaving him, their best advice, never to be found within even that distance of the court, for that the King had given orders that next time they catched him they should escort him to the Galleys.†"

* Il s'éleve de tems en tems des antagonistes de la saignée, qui pour paroître singuliers déclament contr'elle. Il vint à la Cour il y a vingt-cinq ans un certain M***.

† Je finis l'article de la saignée par l'histoire d'un nommé Damascéne qui vint à la Cour en l'année 1669. Elle vous fera voir que de tous tems il s'est élevé des gens qui ont attaqué ce grand remede, et que tous les efforts qu'on a fait pour le detruire n'ont servi qu'à en faire connoître l'utilité et la nécessité. Ce Damascéne étoit un homme bien fait, de belle physionomie, vêtu très-proprement en Médecin; avec ce grand extérieur il parloit bien, et étoit très-hardi. Il débuta par condamner la merveilles qu'il avoit faites; il suivoit la Reine à sa collation dans le jardin du Boulaingrin où il se faisoit écouter comme s'il eut été un oracle. Un Garçon Apoticaire de M. Stuart y étant un jour, prit la parole, et dit à la Reine qu'il ne ne pouvoit pas souffrir que ce Charlatan lui en imposât; que c'étoit un bâteleur et un ignorant, qu'il l'avoit vû monter sur le Théâtre à Rennes et à Nantes, et qu'il ne connoissoit aucune des plantes dont il parloit: et pour le prouver, il entra dans un petit bois qui étoit proche, il en cueillit sept ou huit qu'il apporta devant la Reine, et que Damascéne ne

Be assured that I am incapable of seeking thus for authorities in ancient or modern times for any practice, of the propriety of which I have not the most sincere conviction : But I feel that by persuading you, I may be a means of saving innumerable lives. I have seen but too often that there is but a moment betwixt danger and destruction. " Such declaimers against bleeding we must (says Dionis) learn to endure, but a true surgeon will follow his own convictions. Bleeding ever has and ever will be practised*." " In all ages (says Hoffman) bleeding has been approved as being, in apoplexy, a useful and most natural remedy; one which admits of no delay; which should be used in the first moment of the disease†."

The celebrated Walther bleeds with a fury, with which I really cannot wish to inspire you, but which I like to mention, because it bespeaks his strong conviction, not merely of this remedy being necessary during the time of high arterial impulse, to save the organ from danger, but even in the state of pure veinous congestion, to accomplish the recovery of those who are drowned or suffocated. In those who are drowned or strangled, he opens not only the external but the great internal jugular vein, and not only the veins of one side, but of both : he opens at once all the veins of the neck, all the jugulars external and internal; and, while fomenting the neck with tepid water, he strokes the veins down to work out the coagulated blood.‡ Nay, he requires that, in addition to these, to the four jugular veins, every visible or practicable branch of every smaller vein should be opened, especially the angle of the great fascial vein, where it crosses the jaw, and

pût nommer. Il ne laissa pas que d'avoir beaucoup de sectateurs, parce quil y a bien des gens qui donnent dans la nouveauté, et plus à la Cour qu'ailleurs : mais la suite n'ayant pas répondu à ses promesses sur plusieurs malades qui se mirent entre ses mains, et le Roy ayant connu qu'il n'y avoit que de l'arrogance et de l'effronterie dans tout son procédé, donna ordre qu'on le chassât de la Cour après quatre mois de séjour qu'il y avoit fait. Deux Gardes de la Prevôté le prirent un matin et le conduisirent à une lieue de St. Germain, et là en le quittant ils lui dirent que le Roy lui défendoit d'y revenir jamais sur peine de Galeres.

* C'est au véritable Chirurgien à aller toujours son chemin, il faut qu'il laisse crier ceux qui déclament contre la saignée : ils ont beau s'échauffer on a toujours saigné et on saignera toujours—*Dionis.*

† Abdomin aevo ceu efficax aestimatum, et ab ipsa natura comprobatum remedium est in sanguinius missione, mox in principio mali, sine mora instituta.—HOFFMAN, sect. ii. Thesis Therapeuticae.

‡ Ad nostros conatus autem bono felicique eventu coronandos nobis vena jugularis externa et interna in unoque latere colli secauda est ; tuncque quatuor aperturas per quas abundans cerebrumque premens sanguis educi potest, habemus.——*Walther*, § 43.

the ocular veins in the inner canthus of each eye. Our great surgeon, Wiseman, with less extravagance, but as deep a persuasion of the necessity of very copious bleeding in diseases of the brain, tries to impress it on the minds of his readers, by an anecdote really interesting. He had bled a gentleman, who had received an injury of the head, very often, and he knew well, without taking notice of their rashness, the friends, and even his own assistant, "disliked his so often letting him blood, and were wont abusively to say, *now you shall see our master let him blood again.*" "They concluded (says Wiseman,) that I should be the death of the patient. However, I resolved to blood him once more, and no more." In this final bleeding, Wiseman, after using first a stone porringer, took, when it was full, a pewter one, and pressed it close to the neck in order to compress the vein: It thus happened, that a small hole, which had been melted in the bottom of the porringer, was concealed, the blood ran not merely into the porringer, but through it down his neck, and into the bed unperceived. He left the porringer in his assistant's hands, and retired a little way, affecting to make right the compress and bandage, and he looked sidelong at his patient's face, resolved to blood him till he saw his countenance change. He did observe it change; and thought, that for so full a stream he bled long, and upon stepping up to him, and finding the bed so bloody, he concluded that he had overdone this one bleeding; but next day, when he knew not what to hope for, he found him well in his senses, and discoursing soberly.*

Celsus, aware of the mortal nature of this disease, puts the whole force of the cure, when it is practicable, on this one remedy. His chapter is but a sentence, but it is perfectly decisive: "The apoplectic, (says Celsus,) those who have all the body relaxed, are suddenly cut off; if they survive, they live long; but it is only to drag out a miserable existence, and with the memory altogether ruined. In such deadly relaxation of all the members, bleeding, or kills or cures: all other means seldom restore health, but delay death; the life thus preserved is not enviable. If after bleeding, the reason and voluntary motion do not return, there is no room for hope; if they do return, the patient may be restored to health."†

* Wiseman's Surgery, Vol. 2d, page 131.

† Solent autem, qui per omnia membra vehementer resoluti sunt, celeriter rapi, ac si correpti non sunt, diutius quidem vivunt; sed raro tamen ad sanitatem perveniunt; et plerumque miserum spiritum trahunt, memoria quoque amissa.

Si omnia membra vehementer resoluta sunt, sanguinis detractio vel occidit, vel liberat. Aliud cura-

Such is my opinion of the importance of this remedy, that I reckon it a duty to report these opinions and facts: But no part of the treatment of a patient lying in this oppressed condition, not even his posture is unimportant: Next to saving the organ by lessening the volume and impulse of blood, we are to consider, how to moderate its impulse towards the head. Too generally the patient is permitted to lie in those distorted suffocating postures, into which a paralysed body must decline, the head falling from the pillow, and the shoulders sinking deeper in the bed. The patient while he is suffocated with cloaths, and oppressed by the crowd of friends and attendants, is tormented with volatile salts; warm wine is poured down; opiates and emetics are given; the head is blistered; every thing is done that might excite to a farther accumulation of blood. Do in every thing the reverse of this. Raise your patient into a sitting or reclining posture; have him supported behind; let his legs hang over the side of the bed; bleed him from a large orifice in one or both jugulars; expose him, especially if the weather be sultry, to a stream of cool air by opening the windows and door of the chamber:* sprinkle his face with cold water; apply cold vinegar and water, with a large sponge, over his whole head; dash cold water upon his head and breast; give cool oxymell or honey and vinegar diluted with water for drink. Bleed him while the pulse rises, or until his face change, and if the stertorous breathing relax, if the pulse become frequent and soft, if he swallow more freely, if his groans seem less oppressed, if he raises his eye-lids at last, and appears to know his friends, if he begins to shudder as if feeling the cold, and to move his limbs, you are going to save your patient.

tionis genus vix unquam sanitatem restituit; saepe mortem tantum differt: vitam interim infestat. Post sanguinis missionem, si non reddit et motus et mens, nihil spei superest: si redit, sanitas quoque prospicitur. —— *Celsus*, p. 129.

* In the southern climates of France and Italy, apoplexies are at times, from intense heat, as epidemic as fevers, and more melancholy and alarming. The apoplexy seems in particular seasons to have seized all ranks of people.—"Cujus equidem funesti morbi eventus adeo frequentes erant, ut horrorem mortis, cervicibus humanis, singulo fere momento impendentis, universaliter incuterent. Epidemice hujus apoplexiae causa peti merito poterit ab insueta aeris intemperie; aestas, anno 1693, erat adeo exurens ut squalore et siccitate fere omnia consumi viderentur." Baglieu, next enumerates the colds and snows of a most extraordinary winter, the heat of the succeeding spring, the drought of summer, (when during five months there fell not one drop of rain in Italy;) the horrors war, the thousands of slain that lay unburied, the visitation of earthquakes, and the melancholy that prevailed in all men's minds from these long distresses, and manifold calamities and visitations, when more than ten cities were buried by earthquakes.

When your patient raises his eyes, and turns his head round, observes the bye-standers, and muttering and faultering, begins to speak; when after looking wildly round him, he at last entirely recovers, and knows where he is, do not lay him down again to suffocate among his bed-cloaths: nor do not imagine, because he seems recovered, that all is well and safe; for apoplexy is a disease founded on predisposition, and sure to return, from the first dangers of which he is only relieved: nor do not allow him to lay himself with his head low among soft pillows, and fall asleep; this would be helping him to the brink, and then letting him fall down the precipice again, for sleep is part of the disease. Sleep is dangerous; opium is poison; and I am persuaded that whenever, having survived the first shock without injury to the organ, the patient is struck a second time with apoplexy and irremediable palsy, there is something in the mode of treatment to blame. If, while you are still in the house, you suffer your patient to go to sleep, to indulge that propensity which the disease creates, you will soon be sensible of your error: the slow full pulse, the stertorous breathing, the deep stupor will return. The numbers who going to bed heated, or perhaps flushed, with wine, and who, towards morning, after a long oppressive sleep, are struck with palsy, shows how dangerous a state of the system sleep is to the apoplectic. Keep your patient awake: keep him cool, and fresh, with cool drinks, a pleasant and refreshing stream of air; have him laid on the surface of a firm mattress bed, and at the utmost only in a recumbent posture, not laid along: and when he is to sleep, bolster him high with pillows; sit by him, and watch him, and continue feeling his pulse; and when the snoring and the slow oppressed pulse return, stir and rouse him gently, as you would one who were in danger of falling into stupor, and perishing from cold; and, upon the slightest appearance of decided stupor or turgescence of the face, of headache or confusion, ringing in the ears, or throbbing of the pulse, spare not the lancet, but bleed him again. Let the necessary bleedings be followed by the most drastic purges, especially of Calomell conjoined with antimony, to purge and sicken at once, which wonderfully abates the high arterial action, but do not give the antimony in such doses as to excite vomiting: Give stimulant glysters if required; keep the feet warm with heated bricks; the head moist with cold applications; the body cool with a stream of fresh air; and the movements of the system temperate by giving weak acidulated drinks.

Opiates, and sudorifics which are disguised opiates, qualified with some emetic, are very destructive; for, though they do no instant harm, they increase the predisposition to disease. Blisters are doubtful in their effects: if ever they are to be

used, it is in that chronic apoplexy which I shall presently describe. Emetics are eminently dangerous by hurrying, in a particular manner, the circulation within the head.* There is not, perhaps, in all the books of Morgagni, a case more deeply interesting and instructive than that of Antonio Tita who died from the rashness and ignorance of his physicians committing a fault which is daily fatal, prescribing an emetic: a trivial prescription, God knows: Yet trivial as it seems, from the frequent repetition of it, from it being the favourite prescription of every man who knows not what else to do, it is often followed by the most fatal consequences. "An epidemic disease of the head prevailed in Padua: the weather was hot; and Antonio, now seventy-three years of age, had complained for some time of fullness in his head. On the 4th of May, when the Sun was unusually hot, having spent the whole day in the open air, he suddenly, while sitting at supper, cried out that he was seized with some violent disease; and while he spoke, his tongue failed him, and his limbs became paralytic. Morgagni, being called, ran to his assistance; found his colour natural, his senses perfect, his faculties entire, his respiration free: he had no disorder in his head, but an inclination to sleep. Morgagni sent one to call a surgeon, another to call a priest, lest Tita should presently have a more decided, perhaps a fatal stroke. He had him bled, gave a glyster and retired, as he knew that his ordinary physicians were called; but forbade hartshorn to be applied to his nostrils, lest it should accelerate, in a dangerous degree, the circulation of the blood in the brain. When his physicians arrived, they prescribed an emetic; and soon after its operation, the patient was struck a second time with a paroxysm so much more violent than the first, that his speech entirely failed; a stupor began; and his body was agitated withuniversal convulsive struggles, in which he died.†"

"The effusion of blood was found in the right ventricle of the brain; but it was very fluid, and had in some degree pervaded all the ventricles." The plexus choroides it is most likely had given way. Example is so much more prevailing than the most rational precepts, that you will I doubt not remember this anecdote always.

* Van Swieton (p. 83.) strongly disapproves of gilded powders, as they were called, balsams, cordials, and various stimulant drugs, which it would appear in those days, and in that courtly city, fine gentlemen had carried to feasts, as ladies, at an assembly or concert, are provided with eau de luce. As these were all stimulants, Hoffman condemns them indiscriminately, and in the same place condemns emetics.

† Related in Letter 3d, se ct. 11.

"I have often (says Bursarius) when emetics were to my great sorrow prescribed by others, seen a hemipleghia, or slight and partial apoplexy, changed straightway into deep and universal apoplexy; or a deep and complete apoplexy, become fatal in a few hours."* Whether there is any truth in the common observation of blisters operating as anodynes, and procuring sleep, and whether they do so by causing a degree of congestion in the head, I will not pretend to decide; but I cannot conceal from you that practical writers dissapprove of their being used in the high, active, and sanguineous apoplexy. "Tutius a cantharidibus in sanguinea ut dicunt apoplexia abstinemus," says Tissot; and he supports his assertion with cases where the application of blisters seemed to have proved fatal, though I rather think those deaths accidental.† The patient should also shun the warm bath; for, often being immersed in a hot or tepid bath, he comes out of it with his veins swollen, his face inflated, his breathing short, his head giddy, and his limbs tottering; so that were he detained a few minutes longer in the bath, he would drop down apoplectic.

* Non semel meis ipsis vidi oculis datum ab aliis emeticum, et vehementer dolui, hemipligiam vel levem et particularem apoplexiam illico in validam et universalem transiisse; fortem vero atque exquisitam intra paucas horas in mortem.—*Bursarius*, § 131.

Emetics or vomiting in apoplexy is a rough and dangerous prescription; and I am persuaded that no precautions can make it safe, not even those bleedings which must always be premised. Sydenham imagined he could prevent ill effects by previous bleeding; but even his precaution proves how conscious he was of the danger. "Take away twelve ounces of blood immediately from the arm, and afterwards eight from the jugular vein, and presently after exhibit a vomit of an ounce and a half or two ounces of the antimonial wine."—*Sydenham.*

Et in primis nonnullis signis vitae inventis, ad majorem irritationem infelici non emetica propinaremus. Nam eo ipso non adjuvamus sed jaculamus.—*Walther.*

† Virum vidi quem vesicatorium emplastrum cervici appositum, ut canthariosum ad dentes decubitum profligaret, in soporem conjecit vix post viginti quatuor horas excutiendum. Minuitur periculum sublata plethora; anue tollitur integro? Certe, minuta utcunque plethora, remanet in plethoricis idiossynacrasia quae facillime impetum et phlegosim denuo excitat. Peripneumoniae et pleuritides, quo tempore sanus credebatur aeger, ex minimo stimulo acerbo, subito, majori cum periculo recrudescunt. Vidi, anno 1757, in alia urbe, faeminam sexigenariam, sanguineam, polysarcam, apoplexia arreptam; post venae sectionem, enemata, purgantia, aliaque haud prorsus imperite gesta, cervici, sub eadem pharmacopolae tutela, aponebantur cantharides. Vix, nisi spectator, credidissem, totius inde dorsi phlogosis, angina, acuta pelvis, auctus sopor jam jam discedens, saevi dolores, crudelis anxietas, indesinens jactatio, horrenda mors. Tutius erga cantharidibus in sanguinea ut dicunt apolexia abstinemus; et quando revellere volui, post molles patus semen sinapi fermento interspersum suris applicari jussi; et laetus aliquoties vidi prout tumebant crura liberari caput.—*Tissot*, p. 24.

But bleeding, though it prevents present danger, produces no permanent effect; it alters no secretion, effects no natural action, produces no favourable changes on the bowels or skin, perhaps it but leaves the patient more prone to relapse. It is upon these organs, the bowels and skin, and through these, on the fullness and action of of the sanguiferous system, that we are to reform the temperament of the body: you must watch your patient carefully for weeks, and diet him for life. The patient who has been struck with apoplexy, or threatened with palsy, should be much purged with medicines, or with mineral waters; should go a pleasant journey, or seek a country residence; should avoid the air of a city or the heat of public assemblies: he should shun all strong mental exertions, all deep studies, all passionate altercations: he should be careful to preserve a serene and placid temper of mind, and sacrifice interests, pleasures, or even duties, to health; and when he thinks himself able to return to his occupations or duties, should resume them slowly: his diet should be almost entirely vegetable, since a vegetable diet is sufficiently nourishing for all the purposes of health: he should allow himself no indulgence at table nor in bed; should take no supper; go to bed betimes; sleep cool on a hard and firm matress, and with his head pillowed high; and though he may have fire in an adjoining chamber, must have none in his room: his exercise should be equable and gentle, that of a carriage is the safest and best: he should avoid the heat of the sun, especially in summer and autumn: he should wear flannel, and bathe the head in cold water; but cold bathing can seldom be allowed: his whole life should be correct, regular, and temperate; and he will feel himself well and safe, his senses lively, and his limbs strong and nimble, only while he keeps the stomach clear, the bowels active, the skin perspirable and the body cool. This spare diet and cleanly living, these early hours, morning exercises, and fresh air, produce a renovation of health and strength; and the pampered and self indulgent patient who engages with reluctance in this active manner of life, and is difficultly inured to it, finds it at last his happiest state, and is conscious of an alacrity of spirits, a clearness of intellects, and vigour of health, which he would not exchange for all those gross enjoyments, or that voluptuous languor in which he was wont to indulge.*

* "Longeva oh quantum gens humana, si firme crederet, hanc viribus optime consulere, diaetam quae morbo magis adversatur."—*Tissot*, p. 25.

Of all the dismal scenes proceeding from sudden impulse of blood towards the head, that of child-bed labour is the most afflicting, since, you watch through a long and gloomy night, over one labouring under the most dreadful of all convulsions, and becoming every moment more and more apoplectic: without perhaps the means of giving assistance, you stand responsible for the event.

The womb is a part superadded to the general system of the circulation: its veins or sinuses, as they are called, are capacious in a degree inconceivable to those who are not practised in the arts of injecting and dissecting the uterine system: They gradually expand during pregnancy, till there is accumulated in them a mass of blood equal almost to that of all the other abdominal viscera; in proportion as the womb contracts in labour, this volume of blood is by compression of these veins returned into thesystem. A phenomenon inseparable from labour, and more especially from severe or protracted labour, is, that each pain, while it rouses to great exertions, ends in a state of stupor; not because excitability is exhausted, for if it were, how could it be restored before the returning pain; but because the uterus is compressed, every limb is in convulsive action, and the breath is restrained till that impeded state of circulation is dangerous: at each pain, the face is swelled, and the eyes turgid with blood; and the patient subsides at each interval until roused again, by the succeeding pain, into a state of stupor, different from sleep, especially dangerous when, by the abuse of opium and spirits, it is urged on towards the true apoplectic state: in this condition of the brain, the patient is disposed to apoplexy and convulsion.

When in a young, strong, and plethoric woman, the irritation of a first labour is severe and sudden, the face flushed, the struggles violent, and the screams delirious; she soon falls into a state of stupor; and the ensuing labour-pains begin to be accompanied with covulsion. In place of being roused by the return of each labour-pain, the jaws clench, the neck stiffens, the whole body becomes rigid; she is sensible that something terrible is coming upon her; she struggles and shrieks; her eye, turned upwards, is fixed and staring: she becomes mute with universal convulsion, all the limbs are rigid, the face is distorted, the grasp she has taken cannot be disengaged: the arms and chest are convulsed, and the blood is so injected into the head, that the face is purple, the lips black and protruded, the tongue is thrust between the teeth, and mangled, while bloody foam issues from the mouth: the labour-pains cease, or nothing but the slightest appearance of bearing down can be perceived.

Now, the convulsion being fully formed, takes place of the labour; at each return of pain, the neck stiffens, the eye turns up, and the whole body trembles with the convulsion, and at each returning fit, the face is more and more suffused, and the stupor deeper. No man can witness these struggles, and this injection of the head with blood, without being conscious of their extreme danger: In the few that recover, the neck and face is green with extravasation; and well may the delicate substance of the brain suffer from a like cause: If the patient survive, it is by a long stupor, attended with stertorous breathing, and terminating gradually in a placid sleep, but followed by deep seated headaches and long weakness; more commonly the patient dies: every moment, the increasing swelling of the tongue, protrusion of the lips, and blackness of the face demonstrates the effects of each struggle in driving the blood into the head, and the stupor becomes deep and deadly. The patient struggles, the body is stiffened, the hands are clenched, and the face distorted during the paroxysm; but during all the interval, she lies still, oppressed, snoring, so that she may be heard in the adjoining chambers, and in a state of the deepest stupor. The tongue, bleeding from the unavoidable injuries, is so swelled as to fill up all the mouth. The eyes are protruded; the whole face, lips, neck, and throat tumid and purple with blood, not merely accumulated but extravasated from every smaller vein. She suffers thirty or forty paroxysms of epilepsy during the night, and by the morning, though the epilepsy has ceased, and the patient delivered, the stupor continues, and she dies in a deep state of apoplexy. If such a patient is to be saved, it can only be by profuse bleeding, which I have sometimes repeated three times during a long and dismal night, and by putting an end, at all events, to the labour and the convulsive struggles by delivering the child.

I have been careful to keep this view of the apoplectic state clear and simple, unperplexedwith those subtleties and unmeaning distinctions which nosologists have invented; yet am I conscious that Nosology, i. e. the distinction of the various degrees and species of this disease, is a kind of knowledge which I must not withhold from you. Correct descriptions of diseases, and the evidences of corresponding states of the brain, taken from morbid anatomy, have a natural alliance: were I to leave you uninformed of the usual distinctions and characters of these comatose diseases, or did I fail to join with such diagnostics, descriptions of the condition of the organ, I should leave you without one of the best and surest guides to correct practice; your future progress in the study of books would be interrupted by the frequent recurrence of names and distinctions unknown to you; your practice would be unsure

and vaccillating. Whatever my opinions may be, concerning nosology and its usefulness, it is my duty freely to express them, and to teach you on some principle or other, (either nosological or pathological), how to distinguish the various forms and degrees of stupor.

Nosology *, if meant for any good purpose or worthy of the labour bestowed on it, should certainly be so ordered as to facilitate at once the discrimination and the cure of diseases; it is a practical study, or it is nothing; it should look back to the cause, and forwards to the cure. But it has been the great and avowed princi-

* Even on the very threshold Nosologists stumble upon the first definition, the simple definition of disease; and much and long have they doubted, whether disease be a *privation*, or a *permanent effect*. "Affectionis alicujus impressum vestigium, scilicet qualitas quaedam in corpore nostro permanens." Most learnedly hath this important question been disputed on either side; one sect declaring, "that disease is nothing in all the world but a privation of health:" "That it is nothing but an evil, and that evil is merely the privation of good:" "That disease is in its essence but want of power of action; and power and privation are directly opposed to each other." But it is on the other hand affirmed, That "disease is a positive state or diathesis of the organs." "That this positive state has a power of disordering and corrupting the body:" "That disease is not a mere privation of health, but something *contrary* to health."* This is a species of scholarship admirably ridiculed in the garrulity of the simple Pollonius, whose logic is all of the same cast, especially when he investigates the cause of madness, which he does as profoundly as Gregorius Horstius, saying,

> "Mad, let us grant him then:—and now remains,
> That we find out the cause of this effect;
> Or rather say, the cause of this *defect*;
> For this *effect defective*, comes by cause."

* *An morbus sit Ens privativum?—Affirmabitur quaestio sequentibus rationibus*:

1. Quia morbus nihil aliud est quàm absentia sanitatis in subjecto habili:

2. Quia morbus est malum quoddam: *atqui* malum cum privatione, quemadmodum bonum cum actu convertitur:

3. Quia morbi essentia consistit in impotentia ad agendum: *atqui* potentia et impotentia tanquam habitus et privatio sibi invicem opponuntur.

Contra negativam confirmabit aliquis hoc modo:

1. Quia morbus est positiva partium διάθεσις, p. n.

2. Quia vim alterandi corrumpendique corpus nostrum obtinet.

3. Quia sanitati non privativè, sed contrariè opponitur.

Pro decisione quaestionis notandum, quod secundum *Thomam*, aliosque *Scholasticos* Malum aliud in sese tale sit, aliud verò respectu alterius. Etsi verò omne malum boni privationem importet, quia utrumq; dicit imperfectionem et defectum, non tamen sequitur, illud quod alteri malum est, in sese quoque privationem esse. Quâ ratione tenebrae non aliter quàm per absentiam luminis describi possunt, quia in sese consideratae privationem constituunt: at calor aquae dicit quidem privationem, non tamen in se, sed respectu illius subjecti, cui secundùm naturam frigus convenit.

ciple of the nosologist to decline all speculation; to disavow all knowledge of causes; to let no expression escape him which might lead his reader to suspect him of being acquainted with the condition of the organ, or the state of the system, which produces any given disease. * In all his definitions, the character of usefulness is sacrificed to that of accuracy; no expression is admitted, however illustrative of the disease, which may compromise his reputation or involve him in debate: no questionable theory, no reference to pathology is allowed: his own reputation is uniformly preferred to the improvement of his science: his art is mere logic; with physics it has no concern: his distinctions may be relished in the schools, but are useless in practice. He is chiefly curious about the due marshalling of the orders, genera, and species of disease, so that they may not encounter or perplex one another, about arrangements which import nothing, and accuracy which is never to be useful; he excludes philosophy, that his logic may be pure and unquestionable, and keeps clear of the slightest reference to the probable causes of disease, as if it were derogatory from the dignity of strict scholastic definition, (quod est peccare in regulas logices). Is it possible to approve, or creditable to follow, principles so narrow, and so plainly selfish?

The nosologist is as much mistaken in the analogies on which he founds his science, as in the method which should be pursued to make it useful. He imagines that he follows the plan of the natural historian, without adverting to an absurdity entirely peculiar to his own. The naturalist defines a substance which he sees, feels, and handles, by qualities obvious to his senses: the nosologist records signs and symptoms, but of what condition of the system, of what state of the organ they are signs, he professes to be entirely ignorant. The naturalist would make himself but ill understood, who were to define a plant or a metal without indicating its properties and affinities, without applying the description to some material form; or an animal, without reference to its conformation, habits, and powers. But the definition of a disease, is something ludicrously different from that of any material substance; it is a compressed and concentrated description of the signs, importing a certain state of some organ of the body; which state, the nosologist affects not to know, or refuses to name, lest he should be convicted of error, or involved in disputation: his definition is not the description of a substance by its quantities, nor does he infer

* Pecat itaque morbi definitio, quum ingrediuntur ea quae sunt obscura et hypothetica, ut sedes interna et propria, quae sensibus in *viva homine* non potest distingui."——*C. F. Daniel Prolegomenon*

some material existence from the signs which indicate its presence; his definition is a mere enumeration of signs, which he displays so parsimoniously, and arrays so artfully, as to defy you to infer any thing, : the material sign, the state of the part as discovered by dissection, is wanting; and thence his definitions lose all relation to any material existence, and his arrangements all relation to practice.

Ab theoria abstinendum satius esse puto, (says Sauvages,) quae non nisi fortuito, in veram praxin manducere potest."* This is the spirit in which the study of nosology, the great and important, the practical science of arranging and describing diseases, has been pursued. But we shall not suffer ourselves to be restrained by the prejudices, nor circumscribed within the lines and demarcations of the nosologist's province. Pathology suggests useful and practical distinctions; and I am inclined to risk that censure for the sake of usefulness, which the nosologists have avoided, in order to attain a tame unprofitable correctness. I am surely not far wrong in believing that you will find Pathology (imperfect though it be) more useful than Nosology, or, in other terms, Anatomy more subservient than Logic, to the discrimination of diseases; and however injudicious the combination of these two departments may appear, I am contented to subject myself to every kind of criticism, and would rather have you improve by correcting, or attempting to correct, my definitions, and instruct you by irregular but useful descriptions, than remain safe from criticism, by a dull, formal, blameless mediocrity.

The thing which has been attempted,---the enumeration of signs without reasoning on their import, or thinking of the state of the affected organ,---is impossible: In a science where every term and every arrangement becomes a theory, according to the sense in which it is received, to refrain from reasoning, is to refrain from thinking. The disclaiming all knowledge of causes which might have led the nosologist into practical but not unprofitable disputes, has involved him in useless ones. His ingenuity is exerted in a perpetual struggle with the natural course of his own thoughts, and the natural connections of cause and effect. He endeavours so to define the signs and appearances produced by certain states of the body, or of individual organs, as to exclude the slightest intimation of the organ which is affected, or the state of it by which such signs are produced; and, in this unavailing and absurd struggle, the nosologist mutilatesor supp resses the most characteristic signs, lest the mention of them should suggest a theory, and changes

* How opposite this to the maxim of Hilderius, which, though conveyed in the abominable form of a pun, is yet very worthy of remembrance, ANATOME CLAVUS EST ET CLAVIS MEDECINAE.

the aspect of every case he describes, in order to deliver it in general terms; nor does he allow himself to dwell, even upon the pathognomonic signs, lest they should present to the imagination of the student some shade of the cause or morbid affection. Thus have nosologists, by disavowing all knowledge of morbid anatomy, and of the internal causes of disease, (which yet we should think were as easily investigated as irregular symptoms, and as easily imbodied in a definition as quickened pulse or oppressed breathing,) excluded themselves from the possibility of attaining to even the elements of a definition.

Glance your eye along the countless divisions and petty distinctions of soporose diseases, and you will find one phenomenon, infinitely perplexing to the nosologist, viz. The irregular blending of Delirium with Torpor! This confounds all his definitions, and defies all attempts at arrangement. Stupor or coma is the disease to be defined; but that stupor, that debility of the senses, is marked in its approach by every sign of quickened circulation and violent excitement; and even the deep stupor is interrupted with fits of delirium! Symptoms so incongruous, arranged side by side, give to the definition of any disease an air of perplexity, though there is only required to make the description, at once consistent and instructive, an occasional and most natural reference to pathology or the state of the affected organ. The first state of the disease is a state of arterial action; the second of veinous congestion: the first is the active, the second the oppressed, state of the circulation within the brain: the delirium and coma are the signs of those stages: but if you will separate those two disordered states of the intellect from their physical causes, like all other natural phenomena thus partially exhibited, they will appear very unintelligible, and the gradual declining of the delirious into the comatose state quite inexplicable.

The nosologist, interdicted by the rules of his science from entering into the consideration of causes, knows not how invariably arterial action is followed by cellular effusion and veinous congestion; how gradually the veinous congestion represses the arterial action which produced it; how gradually the oppressed gains upon the excited state of the circulation; how slowly the states of coma and stupor gain upon the states of excitement and delirium; how imperceptibly and gradually these two states of the intellect are blended together. The period of any disease, whether febrile or not febrile, during which delirium and stupor are mixed, is short and transitory; though the alliance of those two states with each other is most na-

tural, yet the delirium, being confounded with coma, seems an inconsistency, and anomaly, which interrupts the simple description of the disease; it is by enumerating delirium, and stupor, as common symptoms, that the definitions of Lethargy, Typhomania, Caros, and other affections of the brain, appear inconsistent, and unintelligible. If the Delirium of Fever terminates in torpor; if the Coup de Soleil, or sudden impulse of blood into the brain from intense heat of the sun, terminates in raving, vomiting, insensibility, and sudden death; if the Caros or febrile apoplexy, the sudden impetuous impulse of blood into the head, terminates in torpor affecting not merely the faculties, but even the breathing and the pulse, the vital as well as the voluntary motions; if the Inflammation of the Brain in children begins in pain and screaming, and ends in squinting, blindness, palsy of the whole body, and sudden death; what have we to infer, but that coma is that final state of the brain in which all extreme vascular action terminates, either by accumulation of blood in the arteries and veins, or by extravasation of blood or effusion of serum. The diseases, included under the class of Comata, begin universally with violent arterial action, and only end in that state of stupor whence they have their name*.

Are they so defined? By no means. The nosologist, evading all the signs of action, dwells only on that stupor which connects the disease with the class in which it has pleased him to arrange it. In defining apoplexy, the livid face, the inflated features, the throbbing pulse, and all that might characterise the disease as a state of arterial action, is suppressed to make way for the stupor of the senses, and the insensible and relaxed state of the limbs and body. The most interesting and only curable stage is not described: the character is taken solely from that stupor which we can seldom remove; which all writers, from Celsus downwards, have acknowledged to be fatal.

Were I to ransack the volumes of nosology, I should not perhaps find more curious examples of distorted, incorrect, useless, definitions, than those of the diseases of oppressed intellect. Has the nosologist truly avoided hypothesis? By no means: every word is a theory, every arrangement an implied doctrine. Indeed we cannot be restrained from reasoning; according to the terms in which symptoms are explained, or the order in which facts are exposed, must we judge of their import. Sauvages who, in the passage lately quoted, protests that "He will abstain from

* When delirium ends in deep stupor, as when in remittent or intermittent fevers, the apoplectic stupor which often marks that type ends, survives the paroxysm that produced it, or that stupor ends in palsy, the patient is gone. "Si sopor cum paroxysmo non evanescat, aut aeger sit typhomanicus, hemiplecticus, febre inflammatoria detentus, de eo conclamatum est."—*Sauvages*.

theory, since it seldom leads to laudable practice," describes the whole class of impeded, vital, and voluntary motions under the title DEBILITATES; a word which is in itself a theory of wide and destructive range.—*Debilities*! Surely, suspension of the senses may be termed debility; suspension of vision, is, in this sense, debility of the eye; suspension of the loco-motive power, debility of the limbs. But the term so incorrectly used implies only *inability*, impotentia; (" impotentia, as Sauvages describes the class, clare et distincte sentiendi, appetendi, consueta vi artus, organave movendi, nec non imaginandi, vigilandi," &c.) that *inability* referrible to a particular part or organ; that part or organ disabled by some injury; and the point we would ascertain is, by what variety in the action of those vessels by which the organ is nourished, maintained, and supported, in the due performance of its functions, is it now disabled?

An organ or part may be injured by want of action in its vessels. When those arteries, e. g. which support a bone, cease to act, and fail to nourish it, it becomes brittle and breaks. When the same arteries are excited to excessive action, and the bone is inflamed, its organization suffers, it becomes carious, brittle, and breaks. The limb, you may say, if you will, is *debilitated*; I should rather say disabled; the word debility I should reserve for expressing the decline of those vascular actions which are connected with the principle of life: it is plain that the bone may become carious, and the limb disabled, either from a *debilitated* action, and being not duly nourished, or from an *irritated and excessive action*, which destroys its structure.

DEBILITY, then, in whatever sense it is used, whether as a pathological term relating to the living actions of the system, or as declaring a simple fact, viz. that a part is injured, is very faulty, and is most awkwardly substituted for the word INABILITY. Is suspension of the senses (impotentia clare sentiendi appetendi, &c.) debility? Then sleep is debility, blindness is debility, lameness is debility, madness from fracture of the scull, raging and furious madness, (impotentia clare et distincte sentiendi et appetendi) is debility; but such madness, blindness, lameness, are the result of the most intense and ruinous action in the blood-vessels, of the inflamed eye, the injured brain, and the diseased joint.

Every individual definition partakes of the incorrectness of that of the whole order. Thus, the definition of apoplexy is, " Loss of voluntary motion, sleep, more or less oppressive, but with uninterrupted action of the heart and arteries *?"

* Motus voluntarii fere omnes imminuti, cum sopore, plus minus profundo, superstite motu cordis et arteriarum.—*Cullen.*

What is this? If it be a description, it is a very indifferent one, since it conveys no idea of the bloated countenance, the hurried pulse, the headache, or confusion which precede this debility of the senses, and voluntary motions: The first stage is omitted: yet it would be just as correct, to define fever, delirium, with thirst, a furred tongue, and a rapid pulse, without mentioning the trembling which precedes those signs, as to define apoplexy "Loss of sense and voluntary motion," without describing the signs and symptoms that precede, perhaps produce that state. Is this a definition? Then even in the strict and logical sense, half the phenomena, and all the appearances which denote the condition of the system, are omitted: it is called sleep; but, if it be so, it is a kind of sleep, more spoken of by evangelists and prophets, than by nosologists, as in the Scriptures where mention "is made of the generations which have fallen asleep." It is expressed besides, in the definition, that "the pulse and respiration continue:" surely, for the person is still alive! but they are deeply affected, the pulse being slow and heavy, and the respiration oppressed: the distinction here insinuated, betwixt the vital and the voluntary motions, is hypothetical, and untrue; for the same pressure, which affects the reason and senses, affects the voluntary motions, and oppresses the breathing and the pulse.

CAROS is another important species among the *Debilitates* of Sauvages: it is characterised by "deep sleep, from which the patient can hardly be roused, but his respiration is notwithstanding quiet and noiseless: It is an acute disease, terminating in a few days, usually distinguished by fever, and redness of the face, with the eyes remaining half open." Another, equally conspicuous species, is TYPHOMANIA, which is defined "Sleep, or a semblance of sleep, while the patient is really and continually awake, accompanied with delirium." The CARUS PYRECTICUS, the Febrile Caros, or slighter Apoplexy, is still more conspicuously at variance with the designation of the class: "It begins with headache and vertigo, continued fever, a flushed face, and rapid and throbbing pulse; it is the disease of adults, of the pampered and intemperate; it is often preceded by sickness, which is rightly attributable to the headache, since it brings with it no foulness of the tongue, nor other mark of a disordered or loaded stomach; it is a disease which requires successive bleedings of the arm and ancle, with emetics interposed. The fever is of the inflammatory type; and often the disease closes with palsy of half the body *." Nay, apoplexy itself, deep incurable apoplexy, is described as a dis-

* CARUS PYRECTICUS, APOPLEXIA MINOR, SANGUINEA APOHNIA, &c. "A Cephalalgia et vertigine initium ducit, cum pyrexia acuta, continua, faciei rubore, corporis calore, pulsu frequenti, et forti; hic

ease accompanied with " a florid or empurpled redness of the face, heat, and a full and heavy pulse, as a disease caused by abuse of wine, violent passions, intense heat of climate or season; which, if it is to be cured, is curable only by profuse bleeding *."

Such are the species, ranked under the order DEBILITATES of Sauvages; diseases, bearing every unequivocal mark of high arterial action; while the profuse bleedings, on which alone Sauvages himself depends for the cure, give the lie to that arrangement, which places them under the class of Debilities, and prove the doctrine I have delivered: these affections terminate in debility, *i. e.* in palsy of the whole or of one side of the body only, when the blood vessels of the brain have actually given way under the excessive excitement. Surely fever, delirium, redness of the face, sensibility to light, and a rapid pulse, correspond ill with the class under which these diseases are arranged? A system abounding with such glaring inconsistencies, in respect to the arrangement of diseases, and with definitions thus speckled and spotted with imperfect unavowed hypothesis, and so deformed with logical inaccuracies, cannot command much respect, nor impose silence or restraint.

Were there not innumerable phenomena in the living body, proving, that there prevails in these diseases, a high excitement in the arterial system of the brain, were there not irrefragable proofs, from dissection, of the vessels giving way under such sudden impulse, I should refrain from embodying, in any definition of the diseases of the head, the facts of pathology or dissection along with the external and obvious symptoms: but even though the attempt were more adventurous and more extravagant, I think it must be useful; I shall, therefore, lay before you a practical SKETCH of the VARIOUS CONDITIONS of the BRAIN, embracing, in short descriptions, the causes,—the symptoms,—and the condition of the organ in each disease.

The more conspicuous morbid states of the brain, as far as I have observed them in practice, or distinguished them in the works of learned authors, may be thus shortly described.

morbus plethoricos, crapulosos, seu intemperantes, adultos gravidus, adorire consuevit; nausea saepe antecedit, quae gravi Cephalalgiae tribuenda est, cum lingua aliunde nitida est, nec ullam suburram in ventriculo designet.

Hic morbus vulgo exiget, plures e brachio et pede phlebotomias, interposita magna dosi Tartari emetici; febris ad synocham attinet; et morbus Hemiplegia quandoque solvitur." &c.—Sauvages.

* " Comitatur initio color faciei floridus, aut atroruber; calor, pulsus plenus. Praecedunt plerumque crapulae, indigestiones, vini abusus, pathemata gravia, insolatio, &c.: curatio a *phlebotomiis* largis, ordiri debet."—Sauvages. Such are the genera and species of this order DEBILITATES.

CAROS, the lesser apoplexy, or febrile apoplexy, is, apoplexy in its first stage, or slightest degree *. It is the disease of men just past the prime of life; of men predisposed by natural strength of constitution, by peculiarity of form, by intemperance and frequent indulgence, or by a native and hereditary tendency: sometimes, from a long tract of weather extremely hot and suffocating, the disease becomes in some degree epidemic.

Caros, or apoplexia febrilis, begins with a high and throbbing pulse, which you would pronounce febrile, were it preceded by shivering, or accompanied with heat, thirst, or foulness of the tongue; there is a manifestly accelerated action in the arteries of the head, evinced by preceding headaches, a sense of fullness within the head†, ringing of the ears, obscurity of vision, giddiness and confusion of the senses, and throbbing of the temples, so violent that the arterial action is felt by a painful concussion within the head, accompanying each pulsation: often vomiting and hiccup precede the state of insensibility.

The patient falls more or less suddenly into a state of stupor, very different from sleep: it is not exhausted nature recovering by rest; but oppression of the brain, verging towards death: it is a deep oppression, resembling the sleep of intoxication, but during which the patient is really awake; yet not so deep, but that he can be in some degree roused: when shaken, stirred, and called to, he opens his eyes and stares; if longer disturbed, he seems a little to recover his intellect; he sometimes turns away his head, and moves his limbs; sometimes after staring round him, as in stupor, he begins to recollect the scene and persons around him; and after a momentary exertion, when oppressed with questions, he replies with a monosyllable in a groaning voice, and falls down again into a state of stupor. When this torpor increases, he can no longer be at all excited, but lies along motionless; his senses quite obscured, his limbs quite relaxed, his pulse still throbbing, but becoming slower.

The oppression, if not relieved by profuse repeated bleedings, terminates in palsy from rupture of the vessels, or in deep apoplexy, and death, from veinous congestion or cellular effusion into the substance of the brain: But, it is not at first apoplexy,

* "Carus cognoscitur ex somno altissimo, vix excitabili, et respiratione tacitu pacatissima."—*Sauvages.*

"Typhomania est simulatus, aut aparens sopor, cum pervigilio reali; vel sopor levis, e quo aegri facile excitantur, cum delirio comitante."—*Sauvages.*

Apoplexia minor, Apoplexia mitis, Apoplexia levis, stupor, torpor, gravis dormitatio, apohnia Hippocratis.

† The Pressura Coelii Aureliani.

since the vital functions are not affected, the limbs not absolutely relaxed, the faculties not quite obscured, the pulse not sunk below 60 in the minute, nor does it pause nor intermit; the breathing is also without stertor.*

Apoplexy is attended not with different, but deeper signs of oppression, affecting not merely the reason, the senses, and voluntary motions, but the vital functions, the respiration, and the pulse. The gradual decline of the vital functions leads to the final close; for while the senses are obscured, the body relaxed, the breathing stertorous, and the pulse slow and full, the breathing becomes more difficult; the pulse becomes gradually slower and weaker; the stupor deeper; the extremities colder: the sphincters lose their power; the face itself changes to a pallid and greenish hue; and the patient expires.

There are thus two peculiarities in this form or stage of the disease, viz. the suddenness of the affection, so that the attack is denominated an Apoplectic Stroke, and the deep immoveable stupor. Those affected with Carus become, in the progress of the disease, apoplectic; but apoplexy, from the two Greek vocables, apo-plectein, implies merely what is expressed by the Latin names Attoniti, Siderati, that the person is knocked down, felled, planet-struck. Yet apoplexy differs in nothing except in degree, from the lighter apoplexy, Caros; it flows from the same hereditary predisposition, and the same excesses; is preceded by the same feelings of headaches, confusion, and giddiness; it is in a moment excited by the same furious passions, by heat, insolation, &c. The suddenness of the stroke prevents the preliminary symptoms from being marked; but the first stage exhibits the same violence of arterial action; the same redness of countenance tending to lividity; the same protrusion of the lips, dilatation of the nostrils for breath, and staring of the fixed and prominent eye. The senses are in apoplexy entirely obscured, the limbs utterly relaxed and palsied, and the torpor profound and immoveable: There is no stirring of the limbs; no motion of the eyelids; no attempt to speak even in monosyllables; no indication of sense or feeling, even when roused, shaken, stung with nettles, or otherwise tormented: no swallowing even of liquids, unless you set the patient upright, close the nostrils, and pour it down, which is never attempted, (so deep is his insensibility,) without danger of suffocation. Even emetics, which are sometimes imprudently given, seldom produce sensible marks of sickness: the stomach and bowels, if the patient survive, are, from their palsied state, distended with flatus: the breathing is slow, loud, and stertor-

* Somnus longus, profundus, aegre excitabilis; cum facultatum principum, et praesertim imaginationis lesione, sine respirationis detrimento, pacatissime et rarissime respirent.

ous, or alternately interrupted and delivered with a loud burst from the protruded lips and dilated nostrils: the pulse, at first soft and full, grows slow and intermitting; the breathing becomes more stertorous, drawn at longer intervals, and delivered again with louder bursts; all the functions become gradually weaker; the extremities become cold, the pulse weak, and the patient dies.

Apoplexy is thus the extreme case of oppressed brain: a proof that where there is stertor and deep insensibility, all the functions are at once affected. If this state is to be at all relieved, it must be in 24 hours *. Sometimes it terminates in palsy, more frequently in death. Often there is found, upon dissecting the brain, no conspicuous mark of disorder †. The essential and inseparable marks of the apoplectic state, are the brain bursting (upon the cranium being raised in dissection) from its confinement within the scull, bulging in the centres of the hemispheres, and seeming more closely bound down in the direction of the great sinuses: when in the apoplectic state the Dura-Mater is cut, the veins are seen turgid and black, blood flows profusely from the opening of the sinuses, and here, (as always when the circulation is retarded,) the surfaces are bedewed, and the ventricles in some degree filled with a serous exudation, which is greater in quantity, the slower the disease, or the longer the dissection is delayed. Often though there is a bursting of the blood vessels, no marks of palsy can be perceived on account of the deep stupor in which the patient lies, verging towards death, before the instant of their giving way ‡.

PALSY, though erroneously ranked with various other excited states of circulation in the class of Debilities, plainly arises from a high arterial action, and every state of excited circulation leads to it. It is that ultimate irremediable injury which the living system suffers, when the vessels of its most important organ suddenly give way under violent and unrepressed action; when blood is extravasated into the substance of the brain, its intimate structure partially destroyed, and half the body palsied: The

* « Si post primas uberesque phlebotomias apoplecticus hujus speciei, ad se non redeat prima die, de eo conclamatum est."

† Willis.

‡ That sudden and fatal apoplexy, such as takes place during the night with snoring and stupor, and is fatal before morning, is often unaccompanied with any organic disease, innumerable authorities prove. Every man must in his own practice remember many instances of sudden apoplectic death, and of sudden death too, from concussions and falls, unaccompanied by any apparent disorder of the brain, but merely with turgescence of its vessels. The following example is not unworthy of your notice:

moment this accident happens, the apoplectic, or febrile action terminates; the stupor lessens, and the patient awakes in confusion: he usually vomits in signal of the local injury of the brain: his senses are still confused; his face is slightly deformed, pale, and bloodless; the mouth is turned to one side, and the tongue palsied, so that though he sees, hears, and understands, he faulters, and cannot speak; he struggles, but cannot rise; one hand lies dead and cold, and one leg is motionless.

Palsy, like apoplexy, is a consequence of arterial impulse; by its nature it is sudden; by the ignorant and learned, equally, it is named the *Paralytic Stroke*: it is truly as much an accident as aneurism or bursting of an artery in any other part of the body: such bursting may proceed from peculiar delicacy, the vessels giving way under a slight action; or from irresistable impulse, which at once oppresses the brain, and stops, only when the vessels give way: it happens from accidental impulsion of blood towards the head, from heat, exercise, passion, or wine: it happens in surgical cases from shocks or falls: it happens in youth from frequent and sudden impulse of blood against vessels of unconfirmed strength: it happens under the delirium of fever, which ends sometimes in palsy, sometimes in fatal stupor: it is most frequently the termination of that peculiar state of action which we call apoplectic; thence we say, "apoplexy terminates sometimes in recovery, often in palsy, but most generally in death." When palsy proves fatal, we find blood recently extravasated: when the paralytic die, the brain, even at the distance

Peter Fasolati, an engraver at Padua, in the 62d year of his age, yet still of a full habit, and liable to no indisposition, died at the very same season as Tita, and even the very day after him, in the following manner: He had gone through no labour, had not been troubled with care and anxiety, as he had been used at other times, and made no complaint of any thing. He had even supped heartily, for he always used to eat freely; and desired to go to bed more early than usual, which he did; but two hours afterwards, his wife, happening to wake, found him not only dead, but even cold, and stretched out in the same manner he had laid himself when he went to bed.

The day following, when the integuments of the cranium were cut into, and while the upper part of the scull was sawed through, and taken off, much blood was discharged; *yet there was none at all extravasated within the skull; none in the substance of the cerebrum or cerebellum; and both these parts seemed, to the touch, to be perfectly natural: there was, I say, nothing ruptured, nothing injured in any part.* There was some water in the lateral ventricles almost limpid, but in small quantity; and some also seemed to flow from the sides of the cerebellum, which was sound, as I have said; or might it not come from the tube of the vertebrae? But *such a quantity of fluid blood distended all the vessels in and about the brain,* that I do not *remember to have seen the like before;* even some small vessels, which used to be scarcely perceptible, were extremely large and turgid."—*Morgagni, Sect.* 3.

of years, bears marks of the local injury; often there are found distinct aneurismal sacs and clots of coagulated blood.

From an organic injury which in a moment deadens, by injuring the sensorium, the most impetuous arterial action, all the functions must permanently suffer. In palsy, along with the muscular power, the intellectual, and even, in some degree, the vital functions are affected. The memory and judgment are visibly disturbed, and the difficulty of speech is not entirely in the organ but in the mind, which is hesitating, weak, and childish. The circulation, and the nutrition are languid, the stomach flatulent, the appetite sickly, the bowels costive, and the whole frame delicate: the body is no longer nourished as heretofore; the limbs shrink, even the single limb which supports the body, and which, by labouring more, should be proportionably thickened, also shrinks: But the vital functions, though faintly and languidly performed, are regular and equable, so that the paralytic live long, unless, by the recurrence of the arterial impulses and want of care, they are allowed to undergo successive strokes of palsy.

A symptomatic disease, like palsy, following occasionally such various affections, must require freer illustrations than any that can be embodied in the form of a definition.

First, It enters into the definition of all the diseases of the brain, whether purely apoplectic, or febrile, that they terminate in recovery, death, or palsy; or rather in death or palsy, for they rarely recover. The extreme vessels, within the delicate substance of the brain, may either be able to sustain the high action, or they may give way: If they continue entire, if no interposed remedies moderate the action, the apoplectic state is completely formed; the stupor and slow pulse show that the brain is oppressed, and death ensues: If they give way, the substance of the brain is injured; the injury to the organization extends, like the general oppresion, to all the vital as well as voluntary motions of the body; it does not suppress, but moderates them: the apoplectic impulse stops, the patient wakes from his stupor, but, is palsied on one side: nature, if not by a perfect, yet by a partial, interposition, arrests the dangerous arterial action, and saves the life. Thus wisely is the living body constituted: its curious mechanism qualifies its excessive actions: cellular effusion in the common inflammation of a limb, deadens and represses the too violent action of its vessels; and upon the same principle a similar exudation prevents the death, from excessive action of vessels, in the more noble parts, in the brain.

Thus, according to circumstances varying in each individual case, according to the violence of the arterial impulse, or the tenuity or peculiar delicacy of the vessels, it happens, that during the stupor of apoplexy, the struggles of convulsion, or the coma of fever (where the patient has lain many days in torpor, deafness, and passing his urine unconsciously), the vessels of the brain give way, and the patient recovers from the oppression of apoplexy, or from the deafness, insensibility, and stupor of fever, by becoming paralytic; nor can it seem surprising, that the pulse which is at last suspended altogether in apoplexy, by the oppression, should be moderated in palsy by a slighter degree of the same oppression.

SECONDLY, It often happens that under a slighter impulse, especially in younger subjects, the vessels suddenly give way, the apoplectic is anticipated by the paralytic state, and the hemiplegia, or palsy of one side, appears as an idiopathic disease. The period of menstruation in girls, and of puberty in boys, when the proportions of the body are changing, and its parts unfolding; when the actions of the arteries are violent, and their strength unconfirmed; when particular parts of the arterial system are more irritable, and the impulses, irregular, and at times accelarated, this dismal accident is liable to happen. The boy goes to bed apparently well; and, when he awakes, is palsified and unable to speak.

Many times I have seen a young person of 15 or 18 years of age, of a sanguineous system, and predisposed form, go to bed, overheated with exercise, with play, dancing, or with riding, or perhaps with wine, having a throbbing of the temples, and giddiness of the head, but unconscious of danger, sensible of no greater degree of confusion than what exercise has often caused, and youth and health dissipated. I have known a young person thus heated, awake in the morning palsied from vessels giving way through natural delicacy, with only a slight and no very unusual impulse of the blood, towards the brain. When the boy awakes, unconscious of what has happened, he finds his head confused, and his tongue faulters; his arm lies powerless by his side; he only struggles to move and attempts to speak: the apoplectic state would have been fully formed had the action been a little prolonged, but in such sudden palsy, it is anticipated by the bursting of the vessels; the impulse which produces apoplexy or causes palsy, is one and the same, but so transitory in a case like this that it passes unobserved.

I remember, with pain, the fate of a very fine boy of 17 years of age, in whom the arterial impulse was prolonged with very sensible effects, which were unhappily ill understood: how far he might have been predisposed to apoplexy by form or tempe-

rament, I knew not, for I never saw him till in a state of stupor, sitting, in a great chair, wrapped in blankets: his face was purple, his lips protruded, and his nostrils expanded; his breathing slow, but not stertorous; his pulse heavy and throbbing, but also slow: his head nodded forward, when set upright: he could be roused, but it was only to answer by monosyllables and impatient grunts. He had been several days in this condition, snoring when laid in bed, and in a state of torpor when set in his chair; had no complaint, no desires, no appetites, no wish but to be left at rest; he took drink when presented to him; could, by perseverance and teasing, be roused to something like conversation, but was perpetually apt to relapse into the lethargic state, nodding, and yawning, "while o'er his eyes the drowsy liquor ran." This young gentleman's situation had been so entirely mistaken, that his danger was aggravated by the very means thought of for preventing it. There was so little appearance of disease, that his silence looked almost as like sullenness, or sluggishness, as stupor: he was, when I was called, actually under a course of mercurial frictions: opium was administered every night at bed-time: his drink was port wine and water: the project of his cure was by mercury and sudorifics. Though I prevailed so far as to have him immediately bled, and leeches applied to the temples, and purged profusely, the apoplectic impulse was not subdued. On the second night, if I remember correctly, the vessels gave way: He was found in the morning paralytic, and is now lame and disabled for life. He has, like others thus struck, recovered his speech, the use in some degree of the left hand, and the strength of the corresponding leg; he is little emaciated; his speech continues slow, but without hesitation; his faculties are entire; and it seems to me, that his period of life, (his growth being not then perfect), has favoured his recovery.

I confess the recollections I have of this subject, viz. the predisposition to palsy, are so far from being correct, that they may be as well named prepossessions as recollections; but were I to name the periods of life in which palsy is most frequent, I should name those in girls, at which the menses first appear, or that in women, at which they cease to flow; and in boys, the age of puberty, and in men, from the 45th to the 50th year. At particular times a slight impulse, even a paroxysm of intoxication, will thus injure the texture of the brain. The abuse of spiritous liquors of the worst description, which government almost promotes, and which the poor, who know no other solace, cannot refrain from, peoples our streets with men, under 40 years of age, trailing one leg,

and starting and staggering along; the abuse of opium in Turkey is not more flagrant or disgraceful.

There are some obvious conclusions, some recollections of the peculiarities of the brain, applicable to this subject, which surely will not escape you. The brain is delicate in its texture, and in its vessels, and is liable beyond all the other parts of the body to ecchymosis and effusion of blood into its substance; thence palsy follows an infinite variety of disorders: the apoplectic or febrile impulse, shocks, falls, even violent bodily exertions, burst the delicate blood vessels of the brain, and are thus occasionally the cause of sudden death. The universal influence of the brain over the intellect, the sensations, and the vital and voluntary motion is such, that those slight extravasations which, in the liver, lungs, and other viscera, of slight consequence, and easily remedied by the natural powers, have, when they happen in the substance of the brain, the most fatal tendency. The insensibility of this organ, the source of sensation to all the others, is so particular, that frequent as rupture of vessels, destruction of substance, and consequent palsy is, we cannot remember that the patients suffer any thing but confusion of head: The patient is astonished, sickened, paralysed, but not pained, though this important organ, and its dependant motions, are quite ruined.

TYPHOMANIA, COMA VIGIL, COMA FEBRILIS, APOPLEXIA SYMPTOMATICA, are various names for those affections of the brain which acccompany fever. Febrile Apoplexy, Caros Febrilis, is that apoplectic affection of the head which is accompanied with pulsation of the temples, flushed face, blood-shot eyes, and a rapid pulse, but the disease is merely apoplectic and peculiar to the head. The Apoplexy of Fever is a symptom of a disease, naturally characterised by heat, thirst, a foul tongue, a sick stomach, and a rapid pulse; when delirium or coma accompany fever, they vary in their degree, are not essential symptoms of fever, and are yet almost inseparable from it; they add to the danger, and are the chief signs from which our prognostics are derived. Typhomania, so named from Typhus malignant, or low fever, and mainomai insanio, is that stage of arterial excitement in the brain, in which the patient seems to sleep while he is really awake; he lies in a degree of stupor from which he is easily roused; stares, mutters, struggles, talks incoherently; and, after an interval of delirium, sinks down again in stupor. This condition is frequent in fever; it is symptomatic of the affections of the brain; it is the active declining into the oppressed state of the circulation: the stupor or compressed state has begun, but the high arterial action or delirious state has not yet

ceased. This mixed state of delirium and stupor is by no means peculiar to fever, but is extremely frequent after injuries of the head; for, after injuries of the head, the patient, often in the midst of stupor, rises, stares about him, falls upon the attendants, struggles, and sinks again into a state of stupor.

COMA is the apoplexy of fever; it is increasing stupor, unmixed with delirium, from which the patient is difficultly and imperfectly roused; it is distinct from sleep; it is that state of the brain which succeeds delirium, when febrile delirium, violent and furious, having continued long, the patient sinks at each interval into coma, which at last becomes continued. When in *Typhoid Fever* the low and muttering delirium has continued long, verging gradually towards coma with subsultus of the tendons; or when from a sudden and very violent impulse of blood towards the head, (as in peculiar types of *Intermittent Fever*), the patient, after a short delirium, has fallen into a state of torpor, accompanied with stertor, the coma or still and stupid state comes on, it is a sign of fatal import. When, during a state of febrile coma, the stools and urine pass involuntarily, the patient's fate is determined; when the delirium or stupor ends in palsy, from the vessels of the brain giving way, the febrile action ceases, and the patient is saved: ("Hemipligia rite succedens, aegri mortem ad annos procrastinat;"*) always the state of the brain proves, upon dissection, that those who die of fever, die apoplectic.

These varieties, and alternations, of the delirious and apoplectic states, have proved too slippery to take any precise or permanent form, in the moulds cast by the nosologist, and are intelligible only when regarded in a pathological point of view. As pictures of disease, definitions, involving at once delirium, and coma, rage and stupor, must be inconsistent; but as suggesting to us the prevailing state of the sensorium, or the state of the circulation within the brain, every combination of those signs, however discrepant, must be interesting. It is from the state of the intellect and sensations, that we take all our prognostics in fever; it is from the ultimate state of the brain, (the regulating organ of the system,) that we are to expect recovery or death; and how difficultly an organ so delicate as the brain, requiring such a volume of blood to be circulated through it, and that volume increased, and its transit accelerated by every general disorder, even by a fit of laughing or coughing, can escape injury or utter destruction where febrile action prevails; how the structure of the brain can be one moment safe under the sudden impulse of an intermit-

* Sauvages, p. 470.

tent, or during the long course of a slow fever, is a very natural subject of reflection, now while we are speaking of coma or the apoplexy of fever.

1st, *Intermitting Fever* is accompanied with delirium and coma, sudden violent, and dangerous in the last degree. If exercise, wine, passion, or opium disorder the circulation of the brain, well may the sudden invasion of an intermitting fever have the like effect. But it is not the mere impulse of the blood, great though it be in every intermittent fever, that causes stupor, but an excitement of the arterial system of the brain peculiar to the intermittents of certain seasons, which often precedes the paroxysm in the form of a slight vertigo, resembling that of drunkenness, is visible during the cold stage in confusion and wavering, rises to delirium in the hot stage, and terminates in a stupor which, if it continue after the paroxysm, is usually fatal. This stupor of the brain, is frequent in autumnal remitting and intermitting fevers: it is frequent in the fevers of Italy and of hot climates: such a state of excitement often seems peculiar to certain seasons or constitutions, (as Sydenham expresses himself,) when something singular in successions of the heats, colds, and dews of autumn contribute to form this impulse towards the head. There is a form of Apoplectic Intermittent which has been distinguished by the name of Tertiana Carotica*. A tendency to excited action of the arterial system of the head urged on by such a sudden and general acceleration of the pulse, as that which accompanies a tertian paroxysm, cannot failto produce its effect instantly. The tendency is evinced by slighter wandering of the senses in the first, and second ague fit; in the third, the delirium comes on, and terminates in stupor early in the hot stage, the stupor survives the paroxysm, if it assumes the form of complete apoplexy, accompanied (unlike any other febrile coma) with snoring and oppressed pulse; and is certainly fatal. Here we perceive that no debility nor general disorder, produced by the fever, is the occasion of death; one organ alone, the brain, suffers; and this affection of the brain runs through all the stages of headache, confusion, delirium, and stupor, or total palsy, in a period inconceivably short.

2*d*, *Continued fever* produces changes in the circulation of the brain slower, but not less terrible, than these. The active or delirious state continues long: the comatose state advances slowly: the progress from the common headache of fever to deli-

* Carotica and caros are superadded to those diseases to express the tendency to sleep or stupor, as carotides are added as a sort of cognomen to the arteries of the head, implying that sleep or stupor is induced by their morbid obstruction, or by tying ligatures upon them. The synonyme by which the apoplectic intermittent and its varieties have been designated are CATALEPSIS QUARTANARIA, APOPLEXIA FEBRICOSA, TYPHOMANIA FEBRICOSA, CARUS FEBRICOSUS, TRITAEOPHYA APOPLECTICA.

rium, from delirium to lethargy, is slow; and the various degrees are denoted by the terms of Typhomania Continua, Lethargus a febre, and Coma Lethargicum: It is this kind of lethargy, (distinguished from apoplexy by want of stertor), which puts a termination to our nervous fever, or Typhus, to the delirious fever of confluent small-pox, and to the jail and hospital fever, which often are marked, even in their commencement, with delirium. There is a kind of febrile delirium which affords the most favourable prognostic; it is that in which the patient, not irascible, angry, nor furious, lies on his back, in a pleasing trance, and thinks he hears the ringing of bells or music, and sees brilliant lights: these are signs of convalescence; they are, I believe, the natural and healthy sensations renewed, but as yet indistinct. There is another delirium in which the patient when roused looks furiously, speaks wildly, struggles, and raves: as this kind of delirium advances, it is accompanied with more of stupor: the patient lies muttering and motionless: the alternations of furious delirium and stupor are irregular, and accompanied with corresponding changes of the pulse: when the stupor is accompanied with picking of the bed-clothes, inarticulate continual muttering, subsultus tendinum, and involuntary stools, the brain is ruined, and the patient gone. The state of the brain in those who die of fever prove this, for it is completely apoplectic: the slow recovery of those who survive, show the injury it has sustained: it is not because the muscular parts have been injured during fever by high vascular action, by want of nutrition, or by rapid absorption, that the whole frame is left so feeble: the indistinct and confused sensations, the loss of memory, the impaired intellect, the gradual recollection of former knowledge; the slow recovery of the reasoning powers, along with the feebleness and trailing of the limbs, which are long of regaining their vigour, demonstrate how much the brain has suffered, and how slowly it is restored; in many it never is.

The more malignant the fever, the more unequivocal are the marks of diseased brain; all the fatal and sudden fevers of warm climates are fevers of the brain, and they are nearly allied with the coup de soleil or sun-stroke. The soldier, after being exposed to the sun, seems drunk, is giddy, raves, becomes delirious, falls into a stupor accompanied with vomiting, and dies. It is obvious, that while the movements of the living system are regulated by the irritability, its solids and fluids are still subject to every physical law; and I have no doubt, that the phenomena of coup de soleil and yellow fever are attributable to the expanded volume of blood in plethoric systems operating upon the brain. When a boy or a labourer lays himself to sleep in the sun, and is found in a state of stupor, with no increase of pulse, with no stertorous breathing; when bleedings, and the effusion of cold water on the head,

are unavailing and the patient dies; when there is found, on dissecting the head, no inward disorder, nor extravasation of blood *, what are we to presume but that the apoplectic state, unforced by any violent arterial action, but proceeding merely from expansion of the volume of blood, has become suddenly complete, but simple, and unattended with any yielding of the veins or arteries? that the vessels of the head have undergone the same universal dilution, that is visible in the hand when exposed to heat. The effects of such a condition of its blood vessels on the vital functions of the brain, you are well aware of, and will not wonder if, sometimes, a full plethoric man exposed in a hot climate to the direct rays of the sun, while he is awake in exercise, and exposed to other exciting powers, suffers such a sudden congestion of blood within the head, that he raves, or is convulsed, or bleeds from the mouth and nose, before he falls down and dies.

Fever is a disease so directly connected with the state of the brain, that it could not seem very extravagant, were I to refer a combination of symptoms consisting of irritated actions, unnatural sensations, and disorder of the intellectual powers, to an affection of the sensorium; but, in place of laying down a theory of fever, I shall plainly state the facts, and in place of ascribing the worst of all fevers, the yellow fever, to the state of the sensorium, I shall refer you to the phenomena during life, and to the dissection of the brain after death.

3. *The Yellow Fever* †, which has been pronounced a disease of debility, affects, most fatally, the young, the robust, the plethoric, those who have just arrived from

* *Carus* ab insolutione, coup de soleil, est omnium sensuum et motuum cessatio, pulsu et respiratione pacatissimis, imo *imminutis* omnibus artubus flaccidis, calore tamen et colore remanentibus, quam aliquoties observavi in pueralis, qui ad solem diu steterant aut dormierant, nec poterent ab hoc sopore excitari: lethalis toties fuit hic morbus et brevissimus: phlebotomiae repetitae, frigida capiti admota sine successu adhibita sunt; pulsus erat minime febrilis; *secto capite nihil laesi inveni.*---*SAUVAGES.*

† Let it not be imagined that I am so infatuated with the importance of the subject, as to ascribe universally the disorders of the body to the diseases of the brain. This would be writing in the manner of that physician, to whom, as to many of our tribe, Sterne showed little charity. "Plato seems in this (says Sterne) to have been a man of much the same temper and way of reasoning with Dr Baynard, who, being a great enemy to blisters, as imagining that half a dozen of them would draw a man as surely to his grave as a herse and six,---rashly contended, that the devil himself was nothing in the world but one great bouncing cantharidis."

It is my professed intention to establish an analogy betwixt the apoplectic state of the brain and the condition in which it is found, (and the stupor with which that state is accompanied) in the last

sea, in perfect health, who are full of blood, who live unrestrained: while women, children, old men, and those emaciated by the heat of the climate, escape. The French, of spare habits, living abstemiously, and who are prepared by purges, evacuations, and temperance, are safe. The British soldier, who resigns himself to all kinds of licentiousness; who feeds according to the custom of his country, drinks of fiery rum grossly, fresh from the still; revels in the streets all night; sleeps under a wall, and is in the morning exposed to the sun,—dies. Among officers, friend meets with friend; their convivial meetings are protracted; they are willing to believe that wine is a preservative, equally, against the dangers of the climate and the horrors of infection; they part, in a state of intoxication, many of them never to meet again (*a*.)

stage of fever; but I am too well acquainted with the many peculiar phenomena that fever exhibits, to ascribe it solely to the state of the brain. The functions of the skin, the bowels, the arterial system, are all disordered: the stomach is affected with nausea, the bowels with diarrhœa, irresistible and incessant; the skin is parched and withered like an autumn leaf, unable to perform its needful functions, and hardly retaining its connection with the body; the blood vessels allow their contents to ooze out through all the pores or extremities, or at the surfaces of the body, forming vibices petechiae, specks, and points, and blotches of extravasation and contagious fever, in common typhus; and stripes of yellow and purple, of complete and incomplete extravasation, down the face, neck, and back, in yellow fever: often the salivary glands pour out their secretion in a copious continued stream, till the patient is exhausted; and always, towards the conclusion of the dise se, the vomitings and stools are blackened by blood oozing profusely from the vessels of these surfaces: Yet still he predominant, the inseparable, the fatal symptom, is disorder of the brain, vertigo, headache; idiotism, delirium, coma, according to the degree of the fever or the constitution of the patient.

The following notes are a vindication of what is delivered in the text. They are so arranged as to correspond with the theorems they are meant to prove. They are high authority for practical facts; since, as will be found in running them over, they are the fruit of severe, constant, steady observation, by men placed in scenes which allowed no trifling; men sincerely desirous of discovering the truth, and delivering it faithfully; their own lives, as well as those of thousands, were at issue. They are chiefly taken from the works of Dr Trotter, Dr M'Lean, Dr Jackson; the two latter gentlemen were companions in that scene, where ten thousand fine fellows, and almost all the medical staff appointed to attend them, were, in but a few months, laid under the turff. Dr Jackson, as well as Dr M'Lean, did his duty fearlessly, and with perfect zeal; so that I may safely say, I know no man who "puts so much of his heart into the act:" His histories of this Endemic of the West Indies are not splendid narratives, but plain, honest, faithful, and useful.

"(*a*) The youth of the patient, and a plethoric state, were invariably circumstances of danger. The state of body, in which the patient was at the moment the disease invaded him, influenced my opinion of his safety. If it came on, after the indirect debility of a debauch in wine, and sitting up late, there was always very considerable danger; nor do I recollect almost an instance of a favourable termination, where the fever thus commenced. I remember being once present at the flank mess, on the Hill, at Port-au Prince, when considerable quantities of wine were drank, and the parties sat up very late. My duty required

It frequently happens that on the evening before the fever is formed, before the man is conscious of being seized with this fatal disease, before the headache or delirium have begun, he is affected with a stupor more resembling intoxication than fever, insomuch that even the experience of a Trotter, or a Jackson, hardly suffice to distinguish the true condition of the soldier thus attacked; he is in danger of being regarded as a culprit, and being subjected to military punishment, while he is really in the first stage of fever (*b*). To this giddy and tipsy feeling, headache succeeds, and is the first sign of danger; headache, lassitude, listlessness, despondency, an entire indifference about life or its concerns, are usually the first symptoms of disease; and often, with the headache, there is giddiness, drowsiness, stupor, resembling those of deep intoxication (*c*); apoplexy sometimes appears; while affections of the stomach, nausea, hickup, undefined and undescribable feelings, are inseparable from this confusion of head. Often the severity of the headache is so great, so sudden, so peculiar, that no words can express the sensation so well as those rude ones in which the common soldier usually describes his own feelings, viz. "a maziness," (as he usually terms it,) "to a degree which gives the "impression of being knocked down by the blow of a hammer, a stupor like

me to leave them at a seasonable hour; but three of the party were next morning seized with fever, and two of them perished on the fourth day. I think it necessary to be thus explicit on a subject that so nearly interests us all."—*M'Lean.*

(*b*) There is a species of delirium that often attends the early accession of *typhus fever*, from contagion, that I have known to be mistaken for ebriety. Among seamen and soldiers, where habits of intoxication are common, it will sometimes require nice discernment to decide; for the vacant stare in the countenance, the look of idiotism, incoherent speech, faultering voice, and tottering walk, are so alike in both cases, that the naval and military surgeon ought at all times to be very cautious how he gives up a man to punishment under these suspicious appearances. Nay, the certainty of his having come from a tavern, with even the effluvium of liquor about him, are signs not always to be trusted: for these haunts of seamen and soldiers are often the sources of infection.—*Trotter, p.* 12.

April 16th 1795. P——n, attendant on the sick in the hospital at Dorcum, *went out in the evening to light a candle, and returned in a few minutes giddy and stupid, as if dead drunk; considered as such, by his companions, he was concealed from the medical officer for twelve hours;* next day, he shewed marks of an oppressed brain; he was deeply *comatose*; the pulse was nearly *extinguished*; the skin was purplish, cool, and clammy: he was *speechless*,—and died in the night, in less than thirty hours from the attack.—*Jackson, p.* 126.

(*c*) Headache, if not actually the first, is among the first symptoms of this, as of other fevers; and the nature of the headache is different in different subjects, sometimes it is almost insupportable,—confined more particularly to the forehead and temples, accompanied by sensations of tightness over the eyes, turgescence and starting; sometimes the pain is more generally diffused, dull and obscure; but it, for the most part, differs from the headache of ordinary causes; though the difference is not easily defined. Headache is almost always present in the commencement in some degree or other; it sometimes abates in the course of the first twelve hours, frequently in the first forty-eight, and almost always before the termination of the third day. During the severity of the pain, the forehead is sometimes hot and burning, sometimes cold and clammy. It happens also, and not unfrequently, that together with, or instead of headache, *the attack is ushered in by giddiness, vertigo, drowsiness, or stupor like deep deep intoxication: fits of apoplexy, hysteria or tetanus,* are observed sometimes, but they are upon the whole rare, and by no means characteristic or peculiarity.

" that of deep intoxication, a total inability of holding up the head (*d*):" headache, vertigo; temporary loss of sight; a red, staring, and muddy eye; a countenance either flushed or grim with sickness; depression of spirits and feebleness of limbs, form the assemblage of symptoms by which the commencement of this fatal fever is marked (*e*).

But after 12 hours, or more, of headache, dejection, coldness, small frequent irregular pulse, the pulse becomes hard and tense; a burning heat diffuses itself over the body; the pain of the head, which had abated, is aggravated; the pulsations of the carotid arteries are such as make the head shake with its force; with a sense of fulness, weight, and heaviness through the whole head; drowsiness and coma, but coma vigil, without the power of sleep (*f*). It is after this reaction, this circulation first perturbed and then excited to such violence, that the yellowness or extravasation appears in streaks, marking the features as if they were touched along the prominent lines, with yellowness running down the cheek and neck, and accompany-

(*d*) The signs of the commencement are not very different from those of other fevers, viz. disagreeable sensations at stomach, nausea, flatulence, listlessness, languor, feeble action of the moving powers, sense of cold, or want of natural warmth, headache, from heaviness and confusion, *or maziness as the soldier usually terms it, to a degree which gives the impression of being knocked down by the blow of a hammer,---a stupor like that of deep intoxication,---a total inability of holding up the head.* The appearance of the eye and countenance indicates srrongly a material deviation from health, but an accurate picture is not easily conveyed in words; the eye is sometimes glossy, the look vacant and idiot-like, torpid, sad, and desponding, the countenance collapsed, dry, and withered like a plant nipt by frost, or failing from want of rain."—*Jackson, p.* 167.

" February 20th, 1790. W——n, an orderly attendant on sick, had been drooping for some days, but said nothing; to-day seized suddenly with pain of the head, as if knocked down by the blow of a hammer; the eye white, glossy, and inanimate; the countenance grim and cloudy, with a tinge of a dusky yellow, exhibiting a colour not unlike that of mahogany."—*Jackson, p.* 127.

(*e*) " The attack of this form of disease is usually sudden, the sense of cold or even horror is considerable, and frequently alternates, during the first hours, with sensations of burning heat; the *headache is often intensely severe*, particularly the pain of the forehead and temples,—it is *frequently preceded by giddiness, vertigo, and temporary loss of sight*; the eye is often muddy, confused and red, staring and prominent, it sometimes seems to blink, or shun the light; the countenance is flushed, or rather overcast and grim, often agitated and confused."—*Jackson, p.* 172.

(*f*) The pain of the head, which had in some degree abated, recurs again, but it recurs with sensations differing from the former; marks of *increased determination are now evident, the pulsation of the temporal*, and particularly of the carotid arteries is sometimes so violent, as to cause the *head and neighbouring parts to shake*; there is also a sense of fullness, weight, and heaviness through the whole head, sometimes with *drowsiness and coma*, but without thepower of sleeping; the recollection is confused, and not under command, but that derangement of the reasoning faculty, properly called delirium, is a rare occurrence. The countenance *is highly flushed, sometimes dark and cloudy; the eye is muddy and inflamed*; the urine is scanty,—sometimes suppressed: the *bowels are torpid*,—difficultly moved by purgatives,—or moved by starts,—the evacuations, watery and in excess, do not afford relief; the skin is generally dry, and the heat is unequal.—*Jackson, page* 184.

ing, in a particular manner, the course of the jugular veins *(g)*, becoming every moment yellower, and at length violet and livid towards the end of the disease *(h)*. This extravasation is the fatal sign.

How reserved and prudent should our profession be in ascribing diseases to imaginary causes: the speculative physician, who, sitting in his closet coolly, proclaims this to be a disease of debility, is unconsciously pronouncing the doom of thousands, while those who have faced the dangers of climate and infection, men called, by every humane and every selfish motive, to observe and report truly and faithfully the nature of this disease, deeply implicated in the tragical scene, whose lives surely pay the forfeit of their own ignorance, have declared, with unanimous voice, that bleedings, profuse repeated bleedings *(i)*; the abstain-

(g) The remittent is at times uſhered in with convulsions, which I have seen repeated at the periods of axacerbation. About the third day, sometimes on the evening of the second, or perhaps as late as the fifth, the yellowness begins to make its fatal appearance *in streaks along the cheek, forming angles with the alae of the nostrils; they purſue the courſe of the jugulars*; the back is also tinged in the same irregular manner; the firſt streaks extend, and become more apparent; the vessels of the eye are evidently affected, and in a few hours the whole body assumes a golden hue; the black vomiting increases, and becomes darker; the patient feels at once relieved, from the pain in his stomach; talks of his happy sensations, which, alas! are only deluſive.—*M'Lean, page* 92.

(h) The skin appears to loſe its natural sensibility, it becomes impervious, and seems, as if it were ſcarcely connected with the living system; the colour, which from the commencement of the period of subsiding, had been gradually becoming more and more yellow, in the latter ſtages is often violet and livid,—in which caſe the pulſe is usually ſmall, deep, and oppressed.—*Jackson, page* 187.

(i) A fever appeared, at Philadelphia, in the years 1793, 1994, and 1797,— of great force and unuſual mortality; in the cure of which, a combination of evacuations,—bleeding and purging to great extent, obtained general credit, among the more enlightened and induſtrious practitioners of that city. The view is wholly directed to depletion; and the quantity of blood which has been taken away, on many occaſions, by the phyſicians of Philadelphia, without deſtroying, or even endangering life, appears enormous; furniſhing a fact, which cannot fail to confound those who have asserted, that bleeding is improper in the violent fevers of hot climates, even that the loss of a few ounces of blood is almost a certain cauſe of deſtruction. The principle of cure, among the physicians of Philadelphia, hinges, as observed, wholly in depletion. The author of this outline employs their chief remedy; but he employs it with a different view, and with different management. At Philadelphia sixteen ounces is reckoned a large bleeding; but bleeding to this extent is often repeated, and accompanied with strong mercurial purges, all tending to diminish the suppoſed, or real increased action. Here bleeding is directed to the amount of thirty ounces, or upwards; in short to such extent, that an impression be at once made upon the system; after which, such powers are recommended, as stimulate to a train of action, congenial to the action of health. The principle is different, in as much as there is a difference between interfering and leaving a business in the middle, or in interfering and conducting it forcibly to an issue.

The Author's Treatment of the Remittent, after considerable experience.—Whenever I was called to visit a person attacked by the Remittent in the manner already deseribed, if there was any inflammatory disposition, or that the patient was a stranger lately arrived, I instantly bled him in proportion to his strength and the urgency of the case; the quantity can only be ascertained by the circumstances then preſent, and cannot be regulated but at the patient's bed-side.—No directions can be given in words, that would apply to any number of cases; as minute occurrences often guide the physician. I am, however of opinion, that much depends on the evacuation being liberal at first.—*M'Lean, page* 164.

ing from wine; the pouring cold wine profusely over all the body; the purging with calomel, and sickening with James's powder, afford the only chance of saving life. "If the pain of the head," says Dr Jackson, "be severe, with sensations of fulness and tension; the pulsation of the carotid and temporal arteries violent, with eyes red and turgid, the pulse tense, confined, labouring, and as it were obstructed; the heat ardent and concentrated, with burning sensations and anguish at stomach, the foundations of mischief are laid, and destruction, unless speedily averted, may be expected to be the consequence."

"Begin with cutting off the hair, and shaving the head; place the feet in warm water, and allow blood to flow from the arm, not as measured by ounces, but till the headache be removed, and the existing state of the circulation actually changed; cold water, or rather water artificially cooled, by the solution of salts, being then poured upon the head *."

Dangerous and loathesome as dissection must be in such climates and such a disease, Dr Jackson has given us an unpremeditated, undisguised, account of the ac-

But the pale relaxed habit never produces denſe and red blood. Physicians have drawn ſome conclusions from this phaenomena. They refer that the first class bear blood-letting, without any material injury, and often with advantage; whilſt the ſecond, cannot bear without evacuation, without injury to the conſtitution. *Impressed with this doctrine, I held blood-letting in a warm climate to be in general improper*; without reflecting, that although this reaſoning might apply to those, who had for any time resided there, it could not apply to new comers, who had not been exhauſted by perspiration or relaxed by heat.—*M'Lean, page* 130.

Here we have the pleasure of seeing men bred in the paradoxical schools, renouncing those deluſions, and subscribing to the invariable practice of those who best knew the disease.

The excitements of passion or wine have the ſame effect as in the apoplectic. Whilſt the disease, (says Dr M'Lean in deſcribing the caſe of a young officer under his care,) was thus holding its victorious career, he became, in a remarkable degree, attached to wine, and intreated me, in a manner too earnest to be refused, to let him have some. I had heard of cures performed sometimes from this delusive call, as if it were the voice of nature preſcribing to herself; and I accordingly indulged him with such portions, as I conceived he might bear without exhausting him; he seized the wine with avidity, pouring on me many benedictions for what he termed the only gratification he could enjoy. The disease, however, continued to increase, his senses gradually decayed, he passed his faeces in bed without any sensibility, and, altogether, became the most distressing spectacle I had ever witnessed. On the twenty-first day from the commencement of the disease he expired, whilſt, in a fit of deliriúm, he was attempting to get out at the window.

Thus periſhed two young men of great promiſe; they were the firſt I ever attended in the Remittent of St. Domingo.—*M'Lean, page* 109.

I understood, however, that next day, he had an exacerbation, and vehemently demanded some porter or wine, which being delayed or refuſed, he was agitated by a moſt furious passion, after which he ſunk into an irrecoverable debility, and expired with spasms and convulsions. This is not the only instance in which violent excitement has proved suddenly fatal.—*M'Lean.*

* Jackson.

tual state of that organ, on which all the vital and voluntary motions have a direct dependence, from the condition of which many of the worst symptoms and most dismal prognostics are taken : I will not alter words which seem almost imagined, for the very occasion of proving that febrile stupor is one link in the apoplectic state of the brain.

APPEARANCES ON DISSECTION IN YELLOW FEVER.

"THE Brain appears upon dissection to be more or less affected in the majority of subjects, who die in the acute state of disease, or under the actual influence of fever; the membranes, as noticed above, are then inflamed, or the blood vessels turgid to an extraordinary degree, give an appearance of commencing gangrene rather than that of inflammation, properly so called; water is sometimes found in the ventricles, with evident effusion in the interstices; but this is an effect,—not general,—not even frequent."

"The vessels of the head, in the first form, are frequently full and distended with blood; in some particular instances, marks of inflammation in the membranes, adhesions and sometimes cheesy exudations near the falx:—water was found in the ventricles on some occasions, but this was by no means a common occurrence—it seemed to be more frequent in diseases of type, than in the violent continued fever; the *distension and fulness through the whole volume of the brain was considerable.* In the second form, particular marks of inflammation were seldom visible, but the *venous system was uniformly* and generally *distended, as if filled by a successful injection*; yet upon the whole the general distension of the brain was less conspicuous than in the former:—the *plexus choroides was often a clotted mass of blood*; the prominent features of disease, previous to death, consisted in a pale and lifeless aspect, in a state of pulse *uncommonly slow,—perhaps under forty, power of motion diminished in an extraordinary degree, but without actual palsy (k)*".

(*k*) That determination happens to the head, is indirectly proved, *by the coma often present; by the flushing in the face, and the visible action of the arteries about the neck and temples;* and directly by dissection, which shows actual derangement, and marks of fullness in the vessels. But what is more to the point, in cases where the indirect proofs have occurred, great suffusions of a clear fluid have been found in the brain. This clearly argues an increased action of these vessels, and an unusual fullness in consequence. I know, it is difficult to draw precise and just conclusions from the state of the brain after death; *because in the struggles of dying, and the peculiar circumstances of respiration during these agonies, almost every one dies in a state of apoplexy. And hence, the vessels of the brain appear ever distended on dissection, though this distention might not exist till a few minutes before death.*—*M'Lean*, p. 174.

LETHARGUS SOMNOLENTIA, Diathesis Soporosa, The SEROUS APOPLEXY, the apoplexy of old age, is a distinction truly founded in the state of the brain: it is a disease rare, or rather unknown in youth, unless you account the stupor of slow and nervous fever, or the fatuity that follows it, a degree of this affection: it is frequent from the 40th to the 60th year. It is a disease arising from the slowly increasing dilatation of the veins, and increased effusion on the surfaces of the brain; changes which, though common to all parts of the body, produce more sensible and alarming effects on the brain. Men of big, relaxed, and corpulent habits, pale, bloated, plethoric, and self-indulgent, who, from affluence and indolence, have lived an inactive and sensual life, are peculiarly subject to lethargy. That dilatation and languid circulation of the veins, which increases as we advance in life, and which probably checks the sound and natural action of the arteries, and puts a period to the healthy function of the organ, is increased by gluttony and indulgence, by inebriety, grief, sorrow protracted, and intense studies, (qui libris diu impulescunt, vitam agentes sedentariam): relaxed circulation, is invariably accompanied with increased exudation, till, at last, the faculties begin to fail; the activity of mind is first impaired, then the memory, and the judgment last of all, for as there is no arterial excitement there is no delirium in this disease*. First is observed a propensity to sleep, the patient snores profoundly, sleeps long, is roused with difficulty in the morning, and is hardly awake during the day: he is more indifferent to his affairs or usual occupations, falls asleep instantly after a meal, especially after dinner, and slumbers over the most amusing book, or in the most animated circle of friends: at last he slumbers incessantly; at table, in his chair, in his office, amidst his public functions; he falls into a degree, not of stupor, for he can be roused, but of torpor, which unfits him for every duty: he stops in the midst of giving orders, forgets what he has said or wished to say, becomes indifferent to all external objects; sleeps or slumbers in whatever posture you place him,

* Qui morbo isto laborare dicuntur, aut magno ejus *insultu* plane decumbentes, in tantum sopore obruuntur, aut vix ab ulla sensibilis objecti impressione excitari queant: quin à punctione, aut vellicatione acriori, si forsan oculos aperiunt, aut membra surrigunt, denuo statim insensiles facti reclinant, et non raro, cum sibimetipsis relinquuntur, *somno perpetuo* indulgentes, transitione facillima *mortem* ipsam, quam in *Typo* simulabant revera obeunt; cujusmodi paroxysmus saepissime *febrem* adjunctam habet, quae tamen, cum aegroti evigilant, et ad se perfecte redeunt, plerumque sponte cessat. Vel 2. pro *lethargi* habentur, qui sensuum torpore immodico oppressi, in somnum fere semper proclives reperiuntur; ita ut medio itinere, immo inter prandendum, aut quodvis aliud agendum, subinde in torporem prolabantur.—*Willis, De Lethargo.*

whether in his chair, or recumbent: his speech is slow, interrupted, and paralytic like; however much roused, he immediately sinks down again; by remaining unassisted, being suffered to snore and sleep, exposed to the fire, or in a soft and downy bed, by being over fed, not purged, nor roused, nor stimulated, he becomes truly apoplectic; and a person who might have been saved and long preserved, as I know from experience, in passable health, dies with stertor and an oppressed pulse.

The increase of the serous effusion is inseparable from every state of oppressed circulation, as anasarca is from the state of a limb compressed by ligatures or tumours; it is accordingly found in all dissections of the apoplectic, epileptic, inflamed, or delirious states of the brain. This serous apoplexy, or lethargy, requires not bleeding, for there is no apoplectic impulse; it forbids not vomiting or blisters; it requires rather purging, sudorifics, and mineral waters; exercise, and early hours; abstemious diet, but consisting of animal food, with a little wine.

The HYDROCEPHALIC STATE is a serous effusion, but of a very opposite nature, never occurring in the aged, rarely in adults, frequent only in childhood, from the third to the seventh or tenth year; proceeding, not from dilated veins and slow effusion, but suddenly arising from high arterial action, as serum is effused in an inflamed abdomen or herniary sac. It is a kind of serous effusion, not preceded by torpor, indifference, slumbering, loss of memory or intellect, but by headache, fever, and the most agonizing screams; and, when the effusion takes place of the arterial action, squinting, dilated pupil, stupor, and convulsive and horrible distortions, close the scene. It is not a dropsy, a slow and harmless effusion, nor is the exudation of serum, distending the ventricles, the cause of any one symptom, except the stupor of fatal prognostic; it is purely an inflammation of the brain.

Is it against pathology that the masters in our profession should inveigh, as if that were the department of our science the most subject to abuse? By no means! It is by substituting conjectures to enquiries, by delighting in their own fancies, and neglecting facts, that the work of refutation is endless: "One buildeth a wall, and another daubeth it with untempered mortar: say unto them that daubed it with untempered mortar, that it shall fall." There is no good cause why pathology, the only precious part of our science, the sole theory that can be supposed permanent, should be excluded from the definition of disease, since the cause is indeed the disease, the thing to be described, without expressing which we define nothing. I see no reason why we should cir-

cumscribe our descriptions of disease to such outward signs as may be seen in the living body, (quae sensibus in viva homine distingui possunt); it is no treason, as far as I can perceive, against the common cause of the science, to join, with the marks and external signs of disease, the phenomena we discover in the dead body. Let the dissection of the dead body be your last appeal in every difficulty, your sole argument in proving the truths of your science: in place of sitting meditating on doctrines in your closet, walk your rounds of practice with zeal and diligence: degrade not your science with a succession of conjectures, when you may establish a chain of facts: when your patient dies, and you are doubtful what precedent his death affords, leave nothing to conjecture, be careful to enquire the very truth;

> "Enter his chamber, view his lifeless corpse.
> "And comment then, upon his sudden death."

SKETCH, OR ILLUSTRATIONS OF THE PARALYTIC STATE OF THE BRAIN.

PALSY is bursting of the blood vessels, with destruction or damage to the substance of the brain, accompanied with irrecoverable lameness of the opposite side of the body:—I know no exercise of the reason, more calculated to improve your talent of observation, to enrich your mind with various analogies, to ripen your notions of the actions and accidents of the circulating system, or to attach you to your profession, as a science founded on true and physical principles, than an inquiry into those consequences which so invariably accompany even the slightest extravasation in the substance of the brain. Let us renounce unequivocally all weak pretensions to a philosophical theory of nervous energy, and proceed, in simplicity and modesty, to record the various species and degrees of extravasation which take place in the brain: we shall then find ourselves engaged in the investigating a suite of facts which have a natural and very interesting connection with each other, and with all the most important, and far the most frequent diseases and accidents to which man is liable: we are, perhaps, far from knowing all the causes of palsy; yet what we do know, is so clearly proved as to guard us from the fascinations of speculative doctrine; we can not deviate into mere theory, nor do otherwise than pursue, steadily and soberly, the line of facts which explains the incapacities and infirmities, produced

at once in mind and in body, by partial injuries of the brain: in an enquiry so purely physical, depending on direct and obvious facts, nothing can pass for reason, but what is confirmed by demonstration; hence illustrations of the nature of those which I am now to lay before you, must be pleasing and simple.

And, first, let me remind you, since extravasation in the substance, or on the surfaces of the brain, is the subject which I have undertaken to explain, of the simple incontrovertible data on which all our reasoning must proceed, of those principles which are now to be put to the test of experience; that there is no part nor organ of the body so exquisite, soft, and delicate in its texture as the brain, which is maintained in its entireness, and supported under the intense circulation of its blood only by being encased and supported by the scull: that there are no vessels so tender as those of the brain, so apt to yield before any sudden impulse or unusual action, or so much disposed to give way spontaneously, even while no unusual force acts upon them, when neither the pulse is accelerated, nor the breathing constrained: that there is no department of the circulating system endowed with such irritability. It seems the natural constitution of this organ, that wherever the faculties are extensively excited or exerted, the function of the brain must be supported by a more rapid circulation; and thence, in a fit of passion, excitement mounts upon excitement, the eyes glisten, and the visage is inflamed, the veins swell and the throat seems suffocated; the temples throb, so that every pulse tells upon the ear and upon the brain, till the senses are in confusion, and the person ready to fall down: it is at such a time and under such impulse, that the arteries are apt to give way, sometimes from the mere impulse of the blood, sometimes from natural delicacy or weakness at some particular point, sometimes from diathesis or gradually increasing distension of the vessels, till they are so weakened as to yield to the slightest cause; sometimes, I doubt not, from ulceration or a varicose state of the surface of the brain, the floor of the ventricle or of its choroid plexus, for, in all parts of the body, slight disorders are often slowly and imperceptibly, preparing the way for our dissolution. but such ulcerations or local debility, give no intimation of danger; the destined vessels give way in the brain as suddenly as the heart bursts, and often (though palsy alone sometimes ensues) the extravasation is as fatal as that from the ruptured auricle; if slight, the patient often starts from his seat, cries out with alarm, vomits, is cold, has lost his voice, and is palsied in one side: while on the other hand, if the laceration be wide, and the extravasation extensive, the patient falls down senseless, struggles, foams at the mouth, passes his faeces and

urine involuntarily, and expires. Thus, strait are the limits betwixt the slower and gentler effusion, which ends in palsy or lameness, and the sudden and fatal one ending in violent convulsions: I must speak then at once and almost indiscriminately, of slight palsy, and of sudden death; for of those who die suddenly and unexpectedly in bed, much a greater proportion die by bursting of vessels within the head, than by bursting of the great vessels near the heart.

Nothing can be more interesting to the pathologist than to observe the various degrees of resistance which this system of blood vessels gives to force or impulse, to the violence of a concussion or of a fall, to the hurried circulation produced by bodily struggles, or to the impulse of blood into the arteries of the head, produced by passion, drunkenness, apoplexy, or other causes of disorder. Every unusual impulse of blood towards any organ, tries the strength of its vessels, and betrays the weaker points: In one person, the slightest concusion or hurried circulation will produce haemorrhagies from the nose and confusion of head, and the vessels giving way even under their usual and gentle action, palsy is produced; while in another, the vessels withstand paroxysm after paroxysm, of the most violent excitement, as in the drunkard, whose excesses pass long unpunished, till the organization of the brain is impaired by repeated violence; till its exudations are augmented, its cavities enlarged, its functions, and all the animal motions dependant upon them, ruined; or as in the apoplectic, whose arterial system acts with such energy that general effusion takes place into the cellular substance, with general gorging of the veins, and general pressure of the brain, till every faculty is extinguished, and every principle of motion stopped. Often in the deepest apoplexy, preceded by the most intense arterial action, the blood vessels withstand the impulse, and the patient expires without one blot or speck of extravasation being found in the substance, or on the surface of the brain, or any more halitus than such oppressed circulation, or the natural changes after death, may account for.

The dissector, well acquainted with the operations of the preparation room, is more familiar with reasoning of this nature; to him the accidents which happen every moment, and interrupt the works of his own hands, explain what will happen when the arteries of the brain are forced by a rapid circulation: what he sees in the dead body is not a mere argument and analogy, but a demonstration of what will happen in the living; and he inquires and reasons about the cause of his good or ill success in injecting the vessels of the dead body, as the physician inquires or should inquire, into the causes of like extravasations in the living system. The dissector while he injects the arteries of the head, and pushes the fluid onwards with a

steady and gentle force, so as to insinuate it through all their channels, distinguishes, by an elastic resistance, whether the injection moves along the vessels, is retained within them by the strength of their coats, whether they are tense, full, and still entire. Sometimes having injected with a force, almost overpowering the elasticity of the arteries, and having advanced to the very limits of what their strength can bear, some of the delicate extremities give way; and he finds among the flesh of the muscles, or in the cellular substance of the glands, or within the brain, upon dissecting it, small extravasations, such as might be compared with ecchymosis in the living body. When the brain especially is thus injected with wax, its tender texture often gives way, and the cerebral substance being dissolved by putrification, washed away by frequent ablution, and the vessels alone left like the branches of a tree, clots of the injected wax are found hanging from their extremities, importing the bursting of the extreme vessels, and representing such clots of extravasated blood as often are found in the living body, and more frequently in the brain than in any other part. Sometimes, at some weaker point, a large vessel gives way under the force of the syringe, and the operator is conscious the resistance is gone, that the injection has failed, that he cannot by pushing his injection fill a system of vessels of which one branch has given way; the resistance being gone at one point, the pressure upon all the other parts instantly ceases.

In the living body, as in the dead, the soundest system of vessels, urged beyond a certain degree, must give way. In the living body, the propelling power is regulated, the vessels are endowed with very different powers of resistance from the mere elasticity of dead matter: the blood of the veins is flowing onwards, in the living body, to the heart in a continued stream, so that the impulse of the arteries is little opposed, and no rude or foreign power is applied to distend and burst them: impulse and resistance are balanced, and yet the vessels give way in the living body as in the dead. "Always," says Walther, "in those who die slowly of apoplexy, we have found extravasation of blood*." There is then a degree of violence which the vessels of the brain never are able to withstand; and every impulse within this degree, especially when actually approaching to it, is full of danger.

In the living, as in the dead body, the bursting of any smaller vessel secures from farther violence the whole system to which it belongs: the gushing of blood from the mouth and nostrils, after falls and concussions of the head, is thence

* In cerebro omnium tarda apoplexia necatorum hominum, post mortem semper sanguinem invenimus extravasatam, § 64.

esteemed no unpropitious sign; and in febrile or apoplectic impulses, in constitutional headaches, vertigo, and determination to the brain, haemorrhagy, from the nostrils, is accounted critical, and indeed it is so, by saving the brain from any strain upon its circulation: Hoffman accordingly found advantage in "exciting artificial haemorrhagy from the nose, by thrusting pins or quills up the nostrils till the blood flowed in a stream*."

In the living body as in the dead, extravasation happens from the very slightest as well as from the most violent causes; from a blow, there is a suggillation of the skin, which becomes black in a few moments, and continues green and discoloured for weeks; from pulling of the hair arises aneurism of the arteries of the scalp, or, in other terms, such effusions of blood as cannot be reabsorbed, and which even destroy the scull: from the severity of a cough, I have often seen sudden and compleat extravasation under the skin of the face, (especially under the looser skin of the eye-lids, or parts under the eyes,) not only discolouring, but raising and thickening it; raising it often in the form of flat broad blotches or little tumors, such as might be covered with the point of the thumb, and perfectly black. From the violence and struggle of hysterical or convulsive paroxysms, we see the face livid with extravasation, which continues in spots and blotches; and, in yellow fever, the cutaneous extravasations forms streaks down the cheeks, neck, and shoulders. In apoplectic and convulsive disorders, as in the young man who fell down in the tennis-court, the extravasation is not limited to the delicate substance of the brain, but the same impulse produces an external suffusion of blood which extends over the neck and shoulders, so that the appearance of the corps is shocking†. Much of the swelling and of the deep colour, in the worst and most dangerous species of inflammation, proceeds from extravasation, especially under the skin, in the glands, and among the cellular substance of the viscera. Tumors of the liver and of the spleen produced by febrile paroxysm, and especially accompanying malignant quartans, are mere extravasations; and the liver, and more especially the spleen, swelled to an enormous degree, are found to be as it were sacs of putrid and extravasated blood. Spots and blotches of extravasation discolour the inflamed bowels when verging towards gangrene. This yielding of the minuter vessels is the cause of much of the destruction, and of many of the most conspicuous phenomena in diseases of all

* "Donec tandem sanguis ex variam venulis ad uncias circiter vi; ope pennulae intrusae, in eo nimirum latere ubi dolor consistebat, fuerit coocatus."—*Hoffman.*

† Vide page 563.

parts of the body; but extravasation which injures only some unessential part in any of the other viscera is fatal when happening in the brain.

Extravasation is produced in the brain by every cause, whether external violence or excited action, which can produce it in any part of the body, and to such causes the head is in a most peculiar manner exposed. By the concussion of a shock, a fall, or the blow of an obtuse and heavy body, blood bursts from the nostrils, mouth, and ears: Is it any wonder, if the concussion, which thus universally bursts the delicate external vessels of the head, causes, at the same moment, extravasation in the more delicate substance and finer vessels of the brain? From natural weakness, the vessels of the brain often give way suddenly even under the natural and healthy action, nor are we aware of any danger till some tragical scene betrays such partial weakness, then the brain, being inundated with blood, the patient suddenly expires. Nor are we always aware of the danger even when the bursting of the vessels is a consequence not of external violence but of arterial action, for a slight impulse will produce danger, when conjoined with any local weakness: the arterial excitement, which bursts the weaker part, is often obscure and transitory, so that we hardly remark the flushed cheek or giddy feeling which precedes the stroke; thence predisposition to apoplexy, habitual headaches, vertigo, hemicrania, and all the slighter affections of the head, are frequent precursors of the paralytic stroke; and excess in wine, paroxysms of passion, and indulgence in venery are never void of danger.

In the brain, where every the slightest touch of extravasation does harm, where every general effusion is fatal, the effects must vary infinitely according to the size of the vessels which have given way, the rapid or slow manner in which the blood is poured out, the part of the brain in which the extravasation happens, and a thousand circumstances, a few only of which come within the limited sphere of our observation.

Sometimes, from an arterial action hardly sensible to the patient, a slighter effusion, an ecchymosis, a gradual oozing out of blood takes place, so slowly, and from such slender vessels, that it is easily repressed by the general resistance within the skull; the effusion is such, as may be compared with the small clots, which, after a full and bold injection of the vessels of the brain, are found hanging to their extremities: only a smaller part of the brain is injured, but it is so injured, that irrecoverable palsy ensues: the patient staggers, and is giddy; he thinks to move, but finds that one leg can no longer support him, and that he cannot grasp with his

hands; he falls down, pale, cold, and almost insensible; he has lost his speech; his mouth is distorted, and he is palsied on one side; and he generally vomits. Sometimes the vessels that give way are large, and the extravasation sudden and widely diffused; the patient, as if struck, utters a cry of alarm, falls down, struggles in the most horrible convulsion of one side of the body, while the other is paralysed; is pale and cold; passes his faeces involuntarily; has an oppressed and intercepted pulse; lies for some hours in the deepest apoplectic oppression, and dies. This is not palsy nor apoplexy, but sudden death; and, upon dissecting the head, the blood is found to have burst from some greater artery; to have burst, in various parts, through the medullary substance of the brain; it fills the ventricles, oppresses the surfaces, and inundates the whole cavity of the cranium, so that we hardly know from what point it has originally burst out; but the disaster accounts too plainly for the convulsive struggles which precede death. This is what has been termed Sanguineous Apoplexy *, Haemorrhagia Cerebri, apoplexy in which, upon dissection, blood is found effused in the cavities of the ventricles; while that pure and simple apoplectic state, in which nothing is remarked but veins highly distended with black and half coagulated blood, is named Apoplexy, from ATRABILIS; as if atrabilis, black bile, an imaginary humour, which was supposed to produce one of the imaginary temperaments of the ancients, had entered into the veins of the brain, and poisoned its functions. Sometimes the vessels of the brain are capable of withstanding any degree of concussion, any force of arterial impulse, till the veins are gorged, the cellular substance injected, and deep oppression of the senses, stertorous breathing, slow pulse, and complete apoplexy ensue.

Thus, we perceive that, while in the dead body the unrestrained pressure of an unskilful injector discovers any weak part, and bursts the vessels, there are also in the living body, occasional impulses which the vessels can never withstand: as in the dead body, when the vessels are weak, the slightest pressure of the syringe will burst them, the slightest scintillation of arterial action will burst them in the living; and the cry of alarm which the patient gives, and the convulsion and tumult of a fatal paralytic stroke, is often preceded by a flushing and redness of the cheek, and by a giddiness, so slight as hardly to be perceived.

* "Haemorrhagiae Cerebri appellatione, nos fortem et pernicialem illam *Apoplexiam Sanguineam* comprehendimus quae ab effusione crueris in cerebro ex ruptis ibi, citra violentiam externam, vasculis, oritur," &c. ——*Hoffman, Tom.* iv. *sect.* 1. *cap.* 7.

Carry it ever in your mind, then, that the apoplectic state is a state of unisveral pressure, for vessels injected and gorged with blood operate on every part and particle of the brain: that the paralytic state is a local injury, proceeding from a more gradual and limited effusion of blood: that the general effusion of blood, which, poured out from a larger artery, inundates the brain, has effects nearly similar to those of apoplexy: that while the patient survives such a bursting of a larger vessel, he is entirely oppressed, but more generally convulsed: and remember, also, that the pathognomonic, or distinguishing signs of palsy, are shrunk features, a feeble pulse, hiccup and sickness, that the senses are entire, but the tongue and one side paralysed; while the distinguishing signs of apoplexy are, a flushed face, oppressed senses, relaxed limbs, laborious breathing, and a slow but often a heavy and throbbing pulse, and the sphincters relaxed. If the vessels give way early in the disease, the action being less violent at the time of their bursting, the whole system of vessels is saved, not by the extent of this haemorrhagia cerebri, but by the deadening effects of this accident on the brain and on the circulation; and thus the life is preserved, by that catastrophe, which paralysis half the body: But if the vessels withstand the impulse long, the apoplectic impulse continues, the arteries work the blood forward into the veins, the substance of the brain becomes turgid, the apoplectic stupor is compleat, and if the vessels then yield, they burst with a wider laceration, and the death is sudden and convulsed.

What symptoms should we look for, when the arteries of the brain give way? Expressly those which we usually witness, viz. the outcry as of one shot, and an indescribable confusion, or the struggles of an animal under those cruel and merciless experiments which I have already described. In effusions, sudden and violent, the extravasation bursting through the substance, or spreading widely over the surfaces of the brain, the cry of alarm and the fall are sudden, the contortions dreadful, and the death epileptic; but when the blood is slowly insinuated, from a breach of slender and extreme vessels, into the substance of the brain, the patient often does not thus fall down all at once pale, alarmed, and powerless, without utterance or capability of motion; but feels his hand powerless that it cannot grasp, his thigh benumbed, but in no unusual degree, his words interrupted in a manner more ludricrous than alarming; his friends or servants observe his condition before he is aware of it; he attempts to rise from table, before he is conscious that he is powerless, and he falls down, because he expected the stricken limb to support the weight of the body. How delicate must the substance of the brain be,

since it allows so insensible an exudation and is ruined by so slight a one? How natural that every greater shock, or more violent impulse of arterial blood, should force such vessels to yield? How infinite the variety produced by the various degrees of effusion, in parts of the brain which give way?

Let us not say, what avails it to know the varieties of a cause which leads to incurable palsy, or inevitable death? It may avail us much, a knowledge of a physical fact can never be unimportant: the establishing it as a truth, that certain symptoms follow certain derangements, that particular phenomena follow what are named causes, that by destruction of part of an organ, or of the whole, certain properties of mind and body are utterly abolished, can never be unimportant: such facts, well and experimentally proved, lays the ground of many interesting analogies; were our inquiries to stop wherever practical applications fail to reward, or seem to close upon our labours, we should walk our round of speculation within narrow limits. If this disorder of the main organ of feeling and motion is one which cannot be repaired, yet it is something to know how it is affected; to know precisely and truly, when our friend has fallen down powerless, what has happened; to foresee danger, and to cure predisposition. Palsy is named debility; and we have all of us an indistinct idea, that grief, fear, despair, poverty, imprisonment, and persecution, or any long continued depression of mind, will produce palsy: it is marked down as chief of the class DEBILITATES by Sauvages; and unfortunately all the prejudices of our senses confirm this fatal error. The patient who falls down, pale, cold, convulsed, with a trembling pulse, and half the body palsied, is debilitated; it cannot be denied. In this debility tonics are given inwardly, and stimulants, as stimulant oils, blisters, hot fomentations, are applied to the part: the practice is good, that too cannot be denied, the fact is true, but the inference is dreadful; for wherever the sames timulants and tonics are given, in the moment of the paralytic stroke, a slighter palsy may be hurried on to an effusion of blood which will immediately produce convulsion; or given in the case of apoplexy, the apoplectic impulse, though slight and perhaps curable, may, by a slight error, be made to end immediately in death. In palsy and apoplexy the impulse is one; the precautions are the same. Palsy is a bursting of the vessels, as little foreseen and as purely accidental, as the bursting of the auricle of the heart: it is a bursting of the vessels of the head, accidental or natural, that is to say, preceded by latent, or by obvious causes. It is always violent, being an effect of a shock, or of an arterial impulse. Debility! might

save us from such a disease, could never cause it: debility artificially produced, or in other terms moderated action, is the true prevention.

We have reduced to plain intelligible principles, a disease which has been ill understood when named and classed among the debilities; and I shall next proceed to lay before you a few of the phenomena, medical and pathological, of this disease. While the symptoms vary according to the degree and manner, the rapidity or the place of the effusion, it cannot be easy to give a just picture of the paralytic stroke, it would be wrong to give an uniform one. When the blood moved by some dangercus, though hardly preceptible impulse, or bursting through some more delicate or weakened part, oozes out and is subtilely and slowly injected into the substance of the brain, the patient feels neither pain, alarm, nor vertigo, but is palsied before he is aware, and his domestics or friends first observe his lameness: he is not sickened as in the more sudden stroke; he does not vomit as when the brain suffers a more violent and sudden injury; perhaps he is walking with his friends in an evening after the heat of an oppressive and sultry day, and they remark him trailing one leg or walking in a feeble tottering and unusual manner *. When a child is struck, the parents often observe it to rise and fall down again, as if in play; nor apprehend danger till they find one leg lame and the fingers of the corresponding hand crooked and bent into the palm †. The master of a family feels himself after supper

* In this and every description I am careful, without the formality of a narrative or case, to express the actual circumstances of such accidents as I have witnessed in practice.

† We see sometimes the effusion taking place very gradually in the brain, even of a child. A fine boy, of three years and a half old, strong, fleshy, and of a ruddy complexion, in the best health and spirits, in habit of body remarkably full, lively, playful, and rambling, was remarked for about a week by his parents to be strangely changed; he babbled, and no longer spoke as usual, neither easily nor intelligibly, but still ran about with his little play-fellows. On the 5th day, on a Saturday's evening, the mother suddenly observed him rolling in the floor, in an uncouth manner; but he got up again; moved about a little in a ludicrous fashion, fell down again from time to time, and rolled so oddly on the floor, that she could not imagine whether the child was but in a playful mood, or whether, as she found, he had actually lost the power of one side. She took him upon her knee, stripped him, handled every limb with all the anxiety of a mother, but found nothing apparently wrong in the limb, nothing to account for his falling and rolling in the floor; but she found the left arm cold and powerless; the hand flattened and dead like; the thumb fallen down into the palm of the hand; the fingers crooked at the points, and his little hand benumbed and entirely powerless.

With grieved and anxious thoughts she put him to bed, and next morning when she went to look to the child, when she took him up and set him on her knee, she found that he could not stand; his lit-

somewhat lame, as if he had been long in a crooked posture *; his servants remark,

tle leg bent under him ; he fell always to one side, and was entirely paralytic. The apothecary electrified him, the very worst thing that could have been done ; the physician, who was next consulted, gave him an emetic which could not fail to compleat whatever the apothecary left undone. Such are the precious consequences of practising by rote and thinking of prescriptions, before thinking of the disease.

I was called to this child exactly four months after the paralytic stroke. Eight days before I saw him, he had begun to be afflicted with pain in the head which came suddenly ; he started up, cried ungovernably as if seized with some excruciating pain. His more violent shrieks endured sometimes for a minute only, but often after a fit of pain he continued to cry ; and when asked what ailed him and where he was pained, laid his little hand on his head, or the centre of the right parietal bone, the palsy being of the opposite side. In a few days this pain decreased, the paroxysms became less frequent, and he was more easily appeased ; the arm he could move a little, but the fingers continued clinched, the whole side powerless ; the leg wasting. I gave orders that he should have frequent calomel purges ; that his head be shaved, and the tender scalp bathed with spirits ; that a blister be applied on the right parietal bone, the centre of the pain, and that it be converted into a perpetual issue ; not to cure his uncurable palsy, but to prevent his death.

By these remedies the pain at the head seemed relieved ; but about a month after, he was strangely affected with such a degree apparently of giddiness, that his head nodded forwards with a violent fit of convulsive motion ; frequently in the course of the day he was seized with a paroxysm of this nature. He became remarkably costive ; and each fit of constipation was succeeded by a diarrhoea which somewhat reduced him, yet he preserved his health ; recovered his flesh ; his parents flattered themselves, and all who saw him willingly believed that he might recover ; when one Sunday's evening, about six months after he was put under my care, the paralytic side became all at once dreadfully convulsed ; the arm and limb were protruded with a fixed spasmodic rigidity ; the paroxysm of spasm or convulsion continued five minutes or more, and returned incessantly till Monday evening, when he expired calmly without a struggle or a sigh.

* *Mense Septembr.* 1677, post coenam non immodicam observavit ipse se claudicare, domestici viderunt ipsum pedem trahere, tum quoque brachium dextrum imbecillius animadvertebatur : somnolentus erat, horâ 9. lectum petiit, nihil minùs quàm de Apoplexia cogitans. Mane horâ 3. expergefactus surrexit micturus et nisi sustentatus fuisset, cecidisset, vomuit, in lectum repositus rursus bis vomuit, sensus internos amisit, loquebatur inarticulatè ; compellatus audivit et alloquentes intuitus est ; non tamen ad interrogata respondit : respiravit sine aliqua molestia aut stertore. Vesperi adstantes agnovit, loquebatur articulatè, at verba non succedebant ad nutum, diebus sequentibus sensim vires recuperavit ; at observabatur memoriae insignis hallucinatio, adeo ut narrationem quandam occiperet, illam tamen pertexere nequiit ob verborum congruorum defectum. Quarta septimana templum adiit, praeter textum nullius doctrinae recordabatur. NB. Die ab insultu sexto incedere valuit, verùm manui tardiùs robur pristinum rediit, diu cultrum firmiter tenere nequiit, nec scribere valuit, et ad-

as he goes to his bed-room, that he drags one leg; before he has got into bed, he is sensible that the arm also is powerless or benumbed; his sleep is deep and apoplectic. At midnight, in getting up to make water, he is entirly paralytic; would fall if not supported; and when laid in bed, vomits, loses his recollection and his senses; speaks inarticulately or only tries to speak, and indicates his assent to whatever is said to him by signs and nods. But in the course of the following day, he gradually recovers, speaks articulately, moves his arm, begins in a few days to walk, but moving the injured leg, as if spasmodically. In a few weeks he is able again, though slowly, to write and to use the palsied arm at table, but always awkwardly. During this convalescence, his memory seems weak, and his reason in some degree affected, and at his best, and after an interval of months or years, the manifest lameness and starting of the leg, the slight distortion of the features, the stiffness and oblique carriage of that side of the body, are conspicuous. Thus, do we perceive the slow progress of an internal effusion of blood, and its progressive effects on the senses, and the muscular power, we are sensible that successive effusions produce perceptible stages or paroxysms in the paralytic stroke, and that the judicious treatment betwixt night and morning, betwixt the first and second internal haemorrhagy, decides the future condition of the patient.

But often even where grief and fever have brought on a tremulous motion of the limbs; when the loss of a child and any continued agitation of mind have brought on a vertiginous complaint, and disordered the circulation within the brain; when from any circumstance of the patient's habit, we should expect the effusion to happen slowly, it really happens suddenly, and is accompanied with a cry of alarm. "A clergyman, 48 years of age, had, about six years before the period of being struck with palsy, been greatly alarmed and shocked at the sight of a suicide: his hand had been in the dark contaminated with the saliva of this unhappy person, whence he conceived such a horror, that he was struck with a sort of

hucdum nonnisi lentè literas pingit, causans praecipue indicem et medium manûs affectae. Curabatur *pil. cephal. aq. cephal. Pulv. et Electuario cephal.* *Nulla* adhibita fuerunt *vesicatoria, nulla V. S. nulli clyster, Externè spiritus, inunctiones, Balsam. cephal.*

Die 1. *April* 1678. *Ipsum cum Excell. D.* D. *Joh. Henrico Hegnero conveni in Trülliken.* Ab insultu apoplectico hucusque debilitatem quandam capitis patitur, quae leipothymiam minatur, nunquam tamen in leypothymiam desiit, quandoque debilitas haec vertiginem quandam minatur, nunquam tamen vel gyrantem vel titubantem expertus est. Cum hac capitis debilitate conjuncta est obtusio quaedam, &c. &c.—*Wepfer, page* 773.

vertigo, a pain in the head, and a want of power in the left leg, which was for long agitated by a sort of convulsive trembling during sleep. At the end of six years, and after severe grief for the loss of an only child, one morning in school, while occupied in the duties of it, he felt all at once a titillation of the fauces, with sickness, a sort of pressure at the stomach, and propensity to vomit: he suddenly cried out that something dreadful was coming upon him, ran to his seat, but fell from it to the ground senseless, and lay an hour in that condition; and, upon recovering his senses, found himself palsied on his left side. From 10 in the morning till 10 at night, he continued deprived of speech, feeling a sort of obstruction in the throat which he intimated to the byestanders by nods and signs: he could not swallow, and the throat was swelled: about 10, his speech returned upon drinking a little wine: in the morning blood, and even grumous blood, flowed from the throat to the amount of six ounces; upon which he felt as if some mechanical obstruction was removed from his throat, so that his speech was restored: for some days, blood continued occasionally to be thus discharged, and in a few weeks he was recovered *".

This cry of alarm is more frequent in those lacerations of the internal vessels which are suddenly fatal. The vertigo and confusion of head, the fainting and falling down,

* *Rev. D. Joh. H.* staturae justae, carnosus mediocriter, colore fuscus: 48 annor. Ante *6 annos terrorem gravem perpessus est cum horrore propter Autocheirum; ab illo tempore tremorem quendam maxime in sinistro brachio et pede; nam in obscuro penduli spuma madefecerat manum sinistram;* accessit etiam *vertigo quaedam et dolor* quidam, et impotentia in sinistro pede: diu noctu quoque valde in somno artus concutiebat. Anteâ nihil prorsus vel tremoris vel vertiginis passus est. Dum 14 annor. erat, è lecto lapsus brachium sinistrum et pedem fregit: verùm ab illo tempore nihil sinistri passus est, sed robustus erat ac studia prosequi potuit feliciter, ac *apud Exteros* studiorum causâ sanus vixit. *Die* 25. *Nov.* 1671, manè jejuno stomacho horâ circiter ante prandium, dum *in Schola* suae vocationi vacabat, praegresso moerore gravi ob filioli unici obitum, sensit titillationem in faucibus cum nausea aliqua et pressione et stimulo circa praecordia, et irritatione ad vomitum: *mox exclamavit sibi periculum imminere aliquod,* properavit ad sedile, inde verò in terram praecipitatus per integram horam omnium ignarus mansit: ad se rediens in sinistro latere paralyticus fuit: ab hora 10. antemeridiana ad 10. noctis loqui nequibat, sensit obstaculum in collo, quod nutibus indigitavit adstantibus: circa 10. loquela rediit potu pauxilli vini. N. B. Ante 10mam noctis liquida deglutire nequiit, et collum inflatum erat. *Die* 26. *Nov.* manè sanguis ex faucibus et naribus ad unc. vi. isque grumosus etiam emanavit, sanguine profusus sensit sibi quasi clavum ex faucibus eductum fuisse, unde liberius loqui valuit. Sequentibus diebus adhuc aliquoties sanguinem ex faucibus et naribus excrevit. In paroxysmo reficiebatur *spir. ceras. nigr.* sumsit quoque *pilul. cephalic.* Sic sensim convaluit. Post 5. septimanam conciona-tus est.

the pale visage and fluttering pulse, the hiccup, sickness, and puking, the distortion of the mouth, the imperfect articulation from paralysis of the tongue, the palsy of the limbs of one side preceded by a numbness and heaviness of the thigh, and a creeping feeling in the arm, are the chief symptoms; nor is the numbness and immoveable feeling of the arm or leg a transitory feeling, but so impressive, that the arm feels like a wooden one, or as if it were actually gone. Witness the very singular case, related by Wepfer, of "a gentleman who was asthmatic and vertiginous, who, when his breath was hurried by quick walking, was obliged to stop, who felt, along with the confusion of head, a breath, as it were, or aura, alarming and sudden, running up to the head and down to the fingers ends. One morning, when prepared for a long walk to Horn, he was, just as he was about to set out, struck down speechless and paralytic: being in a little while recovered, he missed his arm, and complained grievously that he had lost it; and finding his wife's by his side, laid forcible hold thereon, and would not let it go; he said it was his arm, and believed it to be verily "bone of his bone, and flesh of his flesh *".

How little sensibility there is in the brain, must be presumed, from such frequent laceration of its substance and such effusions of blood as might well disorder any part of the animal frame, unaccompanied with pain even when the patient utters this cry of alarm: there is no pain, although the patient all along retains his reason and general feeling from the first intimation of the paralytic stroke to its final close. "The patient sits down at table in perfect health, he is struck with the palsy, he is under the influence of a local injury of the brain, before he has swallowed a morsel, or tasted wine, before any thing could hurt, and while nothing as yet alarms, while he is free from headache, vertigo, or any sensible disorder, any thing that could lessen his sense of pain. In carving, he feels that he cannot handle his fork: after a little, that he cannot grasp nor hold: rising from table, his left leg is immoveable and powerless: moving forward, he falls, if not supported:

* *Generosus Dominus Joh. Jacob Shenck de Stauffenberg*, qui pridem conquerebatur de quodam asthmate, quod inter *obambulandum obveniebat, quo intercipiebatur aliquantulum spiritus*, ut subsistere cogeretur, hinc instar aurae quidpiam ad caput non sine perturbatione, *imò ad extremos digitos vergebat.* Idem Nephritidi admodum obnoxius fuit et plures calculos excrevit. Vertiginis quoque non expers erat. Subinde somno pomeridiano indulsit. *Circa finem Maii aut principium Jun.* 1669, mane cum ad iter procinctus esset *in arce Horn* subitò corruit, hemiplegia lateris sinistri correptus cum aphonia: postquam refocillatus ad se rediit, loqui coepit et conquerebatur unice se brachium sinistrum amisisse, et cum famulus accessisset dextrâ validissime ipsius brachium apprehendit, et hoc suum esse exclamavit, et ne surriperetur, firmiter tenuit.—*Wepfer.*

helped by his friends, he stands and staggers along, but dragging the limb, and his speech is interrupted: placed on horseback, he reclines to one side: the palsy, with indigestion, vertigo, dullness of hearing, irrascibility of disposition, and defect of memory, continue for life *. But through all this process of effusion or of ecchymosis, of blood insinuated and subtilely injected into the substance of the brain, or of sudden palsy, and falling down, from greater laceration of the vessels through all that period in which the senses, and, in some degree, the health, are gradually restored, there is no intimation of pain. The scream which follows the paralytic stroke is alarm, confusion, every thing but pain; and when this symptom is conspicuous, the effusion is usually great, and the event fatal. Sometimes it would appear that the brain in general begins to suffer in its structure, that a particular part is weakened, and a partial and slight effusion precedes often for many months, or even for years, the fatal bursting: The patient, after a first injury, shuffles in his gait, is enfeebled in body, is imbecile in his memory and judgment; and at last, some vessel giving way, suddenly the head falls over upon one shoulder, half of the body is palsied, the face is pale, and the pulse fluttering; and within a few hours he expires. †.

* *Anno* 1670, *die* 19. *Jun.* dum mensae assidet, antequam vel quicquam bibisset, quod nocere potuisset, in prandio nulla praevia vertigine aut cephalalgia, dum cibos incidere conatur, animadvertit se furcillam sinistrâ manu tenere non posse, et postmodum quicquid manu sinistrâ apprehendere conabatur, elapsum protinus fuit; surgens è mensa pedi sinistro vix insistere potuit, et nisi sustentatus fuisset, in terram prostratus fuisset, suffultus stetit et obambulavit; sed nutante pede, non autem trahebat pedem: minus quoque expeditè loquebatur. Domum properans equo insidens inclinabat versus latus dextrum, nec sedere se in equo ipse animadvertit prout consueverat. Primis diebus morbum neglexit, obambulavit, equitavit, postquam appetitus quoque deficere coepit manente apprehensione infirmâ ac loquelae impedimento; accedente etiam dolore in colli sinistrâ parte circa musculum mastoideum et in lumbis, *medicamenta* petiit.

† A woman, of seventy years of age, had for many months declined in her memory; nor did she always see objects, when placed in a certain position; and *as she walked, scarce raised her feet from the ground.* She, having been seized *a year before with a sudden disorder of her head, had, by good fortune, immediately recovered;* but now she fell down suddenly, as she was eating; and became paralytic on the whole left side of her body, and in her right arm. Her respiration was altogether natural, and nearly so the colour of her face, which in her was pale, nor did any convulsions appear; but *her head fell just like that of a dead person;* nor did she give any sign of understanding or feeling, unless that when an incision was made into the jugular vein, she, in some measure, contracted herself. She lived nine hours. *The ventricles of the brain were found to be filled with a fluid blood,* and the right was very much eroded, as well about the external margin of the corpus striatum, as of the tha-

"A noble lady, little predisposed to disease, unless it was by profuse menstruation, and a degree of dyspnoea, supped with her sister and friends, was in health and spirits; and about eleven in the morning, rising, while alone, from her couch, she went first to the stair, then to the passage, to take some linens from a chest, and while in the act of doing so, she felt the stroke, and called loudly to the servant maid, who heard her last words, "Good heavens, what has come over me!" Her maid came just in time to catch her and prevent her falling; she placed her on a chair: instantly her senses failed, her face and hands were livid, and cold as ice; cold sweat bedewed her neck and limbs; her right side was palsied; her eyes were turned up, fixed, and motionless; her pulse quick, weak, and fluttering; her breathing without stertor; her mouth filled with foam; placed upright, she remained so: I found her, (says Wepfer), when I came, without sense or motion; and while the apothecary was gone for medicines, the slight remains of life gradually vanished; her breath went and came at longer intervals; the pulse became obscure; and in less than half an hour she expired *."

lamus nervi optici; but the left about the thalamus alone, and that slightly. The plexus choroides could scarcely be observed. The other parts were all sound.—*Morgagni*, § 13.

A man of 56 years of age, struck with apoplexy, was, in the course of six hours, convulsed and distorted in all the right side, but especially the arm and leg were affected, while the left side lay quite paralytic and powerless. He did not speak, but continually emitted a copious viscid mucus from the mouth. Next day, after a sense of great commotion in the breast, he expired as if suffocated. The brain was sound, but the right ventricle was full of a bloody extravasation, somewhat mixed, and variegated as if with pus. The floor of the ventricle was hallowed out, and eroded, while in the left ventricle every thing seemed sound.

From his wife we learned, after the dissection, that some years before, he had been subject to giddiness; that for many days before his death, he had complained of pain and heaviness of the head; and that blood had burst *from his nostrils the day preceding his death*.—Baglivi.

* "De variis confabulabantur atque ipsamet cum suis nihil nisi optima quaeque de bona valetudine sibi pollicebatur. Post 11 antemeridianam, dum *sola erat, surrexit, è cubili in hypocaustum, indeque ad porticulam sine fulcro ivit*, petitura aliquid linteaminum mundorum è cista, verum vix opus aggressa erat, debilitatem praesentiens hypocaustum repetiit, *ancillam inclamavit ac ultimum hoc effata est, O Jesu quid mihi evenit! vix ab ancilla à casu detineri ac in vicinum scamnum collocari potuit, mox omnes sensus et motum dextri lateris amisit, facies et manus livescebant et gelu frigidiores erant: suaor frigidus per faciem, collum et artus largissime fluebat; advolans omnes sensus abolitos comperi: pila hysterica*, quae ad manus erat, naribus admota, brachium sinistrum movit; dextrum nunquam utcunque digitos complicatos fortissime compresserim: *poma oculorum ambo immobilia*, obtutus fixus, oculi splendidi, nullum visus sig-

We need no dissection, in such a case, to explain what had happened; ocular testimony could hardly add to the assurance we have, from the circumstances of the case, that the brain (it signifies little from what vessels) was oppressed with blood: we might almost say, with the profane knight, " we know it, aye, as well as he that made it:" we also know, that it is but the various degrees of rapidity, with which such blood is effused, that makes the difference of cold pale visage, and fluttering pulse, and the most horrible convulsive struggles. Whenever, the one side being palsied, the other is convulsed, and the patient lies struggling, we may boldly prognosticate and affirm, that the extravasation is great, and the accident fatal *: It is only when the blood has flowed suddenly, and from the greatest vessels, that the pain, the convulsion, the trembling like that of a creature under some cruel experiment, is observed, as in " a young man, of two and twenty years of

num praebebant, immoti semper. Pulsus frequens, celer, debilis: respiratio aequalis absque stertore; spumâ subinde os opplebatur: *erecta in lectum humi stratum in eodem statu mansit:* cum neutri pedum insistere valuisset, instar trunci misere trahebatur. Dum *Chirurgus* accersebatur, ac *medicamenta ex Pharmacopolio* afferebantur, motus omnis periit, pulsus evanuit, *respiratio intermisit, rediitque per longiora intervalla sine stertore ut valida pectoris dilatatione ac citius, quam dimidia hora absolvebatur, vivere desiit.—Wepfer*, p. 668.

If the evidence of the effusion of blood be wanting in this narrative by Wepfer, it is shortly and unequivocally marked in a similar narrative by Morgagni, § 19.

" A man of fifty-eight years of age, of a good natural constitution, but much given to the use of tobacco, fell down suddenly, as he buckled his shoes. His speech was *entirely lost; he had no motion. His face was pale, then grew somewhat yellow, as in a jaundice, and presently grew pale again: some little drops of saliva flowed out of his mouth. In a quarter of an hour he died.* His belly being opened, every thing was sound; and in the thorax also, although the inferior part of the lungs adhered to the diaphragm and back, and both the lobes were very red with blood, especially the right, which was so turgid therewith, that on a slight laceration a great quantity burst forth. *But in the cranium, a good quantity of coagulated blood was found, under the pia mater,* on the anterior convexity of the brain, particularly on the right side. In the right also, and the left ventricle of the cerebrum, a little blood was seen, with a slight coagulum; but the plexus choroides, although it was sound, might seem to have been affected with an inflammation.

* " An old man (says Morgagni, § 17) of seventy years of age, fell suddenly down to the ground, having lost the power of moving and feeling on the left side; and the right being considerably agitated by convulsive motions: his face was red. In less than twenty-four hours he died. His scull being opened, coagulated blood was found between the right posterior lobe of the brain, and the dura mater; and a kind of concreted serum betwixt the sanguiferous vessels of the pia mater, which being cut through a little serum flowed out.

age, strong and healthy, undaunted by any kind of labour, who, having run very fast after his master's chariot, in the depth of winter, and snow then falling on the ground, was thrown into a profuse sweat at the time, and neglected to change his clothes: Next morning, upon leaping out of bed, he fell down three times headlong, had lost all sense, and being lifted up, complained of a cruel deep-seated pain in the head, especially in the occiput, and was soon after affected with fever, lassitude, and universal pains: His disorder tended to a sort of lethargy; notwithstanding bleeding and cuppings, he was, on the morning, taken suddenly speechless, and lay for an hour immoveable, as in an apoplexy, after which the pain of the occiput was exasperated, and extended to the shoulders and spine, in a most violent manner. On the 9th, being bled in the arm, the symptoms relented for a little, but the apoplectic paroxysm returning, he died.*" This is a case highly interesting, since it seems to comprise, in its various periods, a succession of internal haemorrhages, and proves how little the greatest effusion of blood affects the intellect till it compresses the whole brain: It also proves that the haemorrhagy may be repressed by the general fullness, and the death of the patient be retarded, even where the blood flows from the carotid artery; by this case are we reminded, that every such internal haemorrhagy is an aneurism, but with the peculiar effect of compressing the brain. "The head, the proper seat of the disease, (says Morgagni), was next examined; and where the medulla prolongata goes out from the cranium, grumous blood was found, which had *flowed out from the lacerated trunk of the internal carotid artery*: the ventricles of the brain contained a great quantity of a saltish water; the right and left contained also a portion of condensed blood."

It is necessary that I next unfold to you the causes from which such internal haemorrhages arise, even before I prove to you that they are haemorrhages; for as yet you have no proof that blood is, as I have affirmed, injected into the substance of the brain. Concussion is a frequent cause of such effusion; but by far the most frequent cause is an arterial impulse, or excessive action in the vessels of the brain. Even in cases of concussion, as in that narrrated in the foot note†, the

* Morgagni, p. 20.

† A man of sixty years of age, of a sanguineous temperament, and endowed with a good habit of body, by accident had a fall in walking, and struck his head violently against the ground. Being slightly stupid, his forehead being bruised, and blood gushing out from his nostrils, as also a palsy of the left arm having followed these symptoms, so that neither sense nor motion remain-

marks of arterial impulse, the redness of the face, laborious respiration and quickened pulse, are so conjoined with haemorrhagy of the nose, palsy, and other marks of external and internal bursting of the vessels, that we are left in doubt whether, even in cases of direct violence, the haemorrhage may not be progressive, and whether the excited state of the circulation may not have its share. But the cases in which the excited state of arterial action, and the truly haemorrhagic effusion of blood, at once or at successive impulses, is clearly marked, are very numerous and very interesting. Often the arterial action is slight and transient, the habit being marked only by headaches and vertigo, the actual presence of arterial excitement by slight confusion, and a flushed cheek, while its effects are dreadful, the patient falling down, with the limbs distorted, and the faeces involuntarily discharged*. Such is often the end of those who indulge in wine; sometimes their death is sudden, attended with no sign of palsy, except the involuntary passing of the faeces; but often it is preceded by a marked apoplectic state, as in the young man, a native of Bologna, whose case is narrated by Morgagni in nearly the following words: He was no more than fourteen years of age, and yet excessively abandoned to the drinking of spirituous liquors: the slightest exercise, or sitting by the fire, oc-

ed in it, he was brought into the hospital of Sancta Maria de Vita at Bologna. *He had a full red colour in his face, a laborious respiration, a hard and moderately quick pulse,; but in every other respect there was no preternatural appearance, except the paralysis already spoken of. On the fourth day he was speechless*; on the beginning of the fifth he died. In the belly and chest every thing was natural: the os frontis bore no mark of injury, that the senses could perceive; though a little blood was taken away from between the teguments and bone, which had stagnated there from the contusion. Upon opening the skull, the dura mater shewed only a slight mark of contusion, which did not reach to the pia mater; but in the right ventricle of the brain, *about two ounces of extravasated blood were found concreted*: and the corpus striatum, with a part of the plexus choroides, was so much eroded, that scarce any vestige of it remained.—*Morgagni*, Letter ii. art. 11.

* A man of about sixty years of age, who drank freely of generous wine, though he was frequently used to fall down with a vertigo, was at length, on a certain day, just after dinner, when he seemed to be very well, *except that his cheeks were redder than usual*, found lying dead on the ground, his upper limbs being extremely contracted, and the faeces alvi emitted. The cranium being sawed through, and the dura mater perforated anteriorly, a limpid water burst from betwixt this and the pia: and the pia mater, which was of a palish colour, contained a gelatinous concretion of serum in the interstices of its vessels. In the lateral ventricles, some of the glands of the plexus choroides were so turgid as to equal the largest lentils in magnitude; *and in the right were two grumous concretions of blood.*——*Morgagni*, Letter iii. 22.

casioned in this boy profuse haemorrhages from the nose, without any apparent cause. From brisk and lively, he became stupid and oppressed; and but a few days after this condition was remarked, (though he had conversed in the morning with his friends, and had dined as usual at the general table,) he was found in the afternoon lying flat upon his bed: he had vomited: he was compressing his head powerfully bewixt his hands, as if suffering extreme pain: he was speechless, and soon after motionless. A physician was sent for, by whom he was bled: smelling salts were applied to his nostrils: he seemed to recover a little, but soon relapsed into stupor, signifying his consciousness of what was spoken, or done around him, only by nods: his pulse was low and intermittent; his respiration laborious: there was foam about his mouth: when cupping glasses were applied to his shoulders, he seemed unconscious of what was done; but when applied to the thighs, they gave him pain: he cried out inarticulately, and endeavoured to remove them with his hands: before midnight he expired. "When I cut (says Morgagni) into the integuments of his head, which was the only part I dissected, more blood, and that more black and fluid than usual, was discharged. Only a a few drops of the same kind of blood were found in the sinus of the falx, which was in every other respect empty. In the lateral ventricles, and in the third, some little quantity of serum appeared. But under the cerebellum, the substance of which was more soft than it ought to be, almost in the middle, I found about two spoonfuls of black and concreted blood."

Nothing surely can be more interesting than this case, carrying with it such a variety of practical conclusions; marking so distinctly the predisposition generated by youth, and excess in spirituous liquors; the frequent external haemorrhages relieving the internal vessels at every paroxysm of action produced by heat, exercise, or wine; the internal haemorrhagy at last happening in a moment, and causing sickness and confusion; the lad vomiting, holding his head, and falling soon into a state of stupor; retaining his senses, because the effusion was partial; having no partial palsy of one side, because the effusion was not in one hemisphere, but general over the cerebellum: his fate was decided from the moment of his falling down.

There is not in the records of medicine, a case more melancholy, or marking more distinctly the consequences of successive effusions, than that of the greatest man in our profession in that age in which he lived, I mean the celebrated Malphigi. "Marcellus Malphigius died in the sixty-sixth year of his age: he was of the middle stature, his body inclining to corpulence, his habit adust: he had in consequence of intense application of mind been

subject for many years to vomiting and fits of the bile, and when these paroxysms abated, palpitations of the heart ensued. It was upon the 25th of July in the year 1694, after long continued melancholy, anxieties, and disorder of mind, that he was about mid-day struck with apoplexy, palsy of the right side of the body, and distortion of the eye and mouth. Various remedies were used, especially bleeding in the arm, cupping and scarification of the shoulder, sternutatory powders, synapisms to the soles of the feet, with such other spirituous and stimulant medicines as are esteemed in this disease. By the force of these remedies, after four days of great suffering from disorder in the head, he seemed to recover from this hemipligia."

"But such recoveries are rarely perfect, (says Baglivi), and in this truly great man we had the unhappiness to find his memory and faculties of mind impaired: he cried like a very child from the slightest imaginary cause, and was affected with indigestion, loss of appetite, and convulsive motions, in which desolate condition he lingered on from July to November, when the confusion of head and vertigo having increased for some days, he was once more struck with apoplexy, and in a few hours expired."

DISSECTION.

"His heart was greatly enlarged, and the walls especially of the left ventricle thickened to two inches; the kidneys, and especially the pelvis, were enlarged, and the ureters so dilated, that before his death, while he laboured under calculous complaints, he could sensibly feel the stones pass down along the ureter into the bladder, whence they were immediately expelled, and a small stone was found in the bladder, which was known to have fallen down there four days before the last attack. Upon opening the head, and cutting into the right ventricle of the brain, there was found no less than two pounds of black and grumous blood; while in the left ventricle was found only an ounce and a half of yellowish serum. The vessels of the brain were varicose, and the dura mater adhered with uncommon firmness to the scull. These are all the circumstances I observed in dissecting the body of this learned man." (Signed) GEORG. BAGLIVI.

The severe studies exciting and disordering the circulation of the brain; the predisposition marked by vomiting and bilious attacks, *i. e.* fits of headache and sickness; the paralytic stroke sudden, complete, and accompanied with apoplectic symp-

toms; the partial recovery, but with continued indigestion, loss of appetite and convulsive motions; the increasing vertigo and confusion of head; and the last final effusion of no less than two pounds of grumous blood, forms a most interesting scene *.

The case of Mathias Stoker, related by Wepfer, is also interesting in the last degree, as marking the slow and subtile insinuation of the blood, the palsy gently and slowly increasing, the insensibility of the brain, the slight degree in which the senses and reason are affected, by the injection of blood into its substance, and the dreadful convulsions which close the scene. "This man was a potter, of good stature, fleshy, of a ruddy complexion, and just thirty years of age. He had laboured day and night in the sultry heat of summer, in the month of May, modelling a ponderous earthen jar fit to hold 30 pounds. Towards afternoon, he was struck with hemiplighia, so that he could neither turn the wheel with his foot, nor model the clay with his hands. He could walk indeed, and he could raise his hand to his head, but his hand seemed to himself a leather or a wooden one, and his foot he trailed after him. No predisposition to the palsy had he ever observed, except that for half a year he had, after any drinking bout, felt intense headache.

"From the moment of this attack, he had, especially upon lying down, a dreadful pain in the head. Though he could mark no particular part as the seat of his pain, but said that he was universally and equally affected, yet was he particularly observed to rub the right side of his head with his hand: he had continual irritations, and frequent vomiting of food, bile, and mucus, and he threw up also many worms: he frequently fainted, sometimes while in bed, but more frequently when having taken a purge, he had got up, and sat long at stool; and when he fainted, he became deadly pale and cold, and breathed loud and hoarse; his feet were continually cold, so that flannels, heated bricks, &c. could never restore them to warmth. He never rested, so violent and incessant was the pain of his head; if he slept or (slumbered rather) he became delirious, and his face was flushed: his appetites of every kind entirely forsook him, and though thirsty at first, even that natural desire at length left him: his urine was red and flame coloured; and, from the moment of his being struck with palsy, he never perspired.

"The quack who was first called had bled him, for the patient believed that the omission of his customary bleeding had caused some humour to fall down upon his side.

* I have not Baglivi nor Bonetus by me. I extract this narrative from a voluminous system of notes, which have, in some places, been hastily written; and cannot but wonder if this be true, and almost suspect, that I have put down two *pounds* in place of two *ounces*.

Christopher Simonius being called on the third day, ordered him a doze of purging cephalic pills. He had been costive for three days, and these gave him several stools: again he vomited worms: having used the pills a fourth day, he was manifestly weakened, and fainted when raised from bed. Blisters were now applied to his arms, shoulders, thighs, and feet, which, though they produced large vesications on the upper parts, never affected the lower extremities in the slightest degree. The blisters were made then more acrid, but without effect; and though from four successive glysters he had some relief, it was of short duration; the terrible headache returned. He had a decoction of onions in beef tea given him, on account of the worms, which brought away many, dead, nor did he from that time complain more of tormina in the bowels: he was bled also in the foot, but with very temporary relief. In the space of four weeks, he was greatly reduced: he shut his eyes very close and firm, which he said he did from the intense pain within his head: during the three latter weeks, he lay continually in bed, though during the first week, he was wont to get up often unsupported and alone: having at the end of the fourth week, on the 11th of June, had a stimulant suppository administered on account of constipation, he fainted during the purging which it excited: when he recovered, one leg trembled convulsively; and, in the afternoon, a horrible epilepsy came upon him; his limbs and whole body were distorted and convulsed in a frightful manner: he was especially bent back by a dreadful opisthotonos which, with but slight remissions, lasted three hours; and when this epilepsy ceased, a deep palsy ensued: he lay deprived of sense or motion; nothing could rouse him: what was poured into his mouth, he could not swallow: when he first fell into this stupor, it seemed a natural sleep; but on the following days, he breathed loud and hard: he expired on the 14th of June. The head was the only part we were permitted to open. On the scull-cap being removed, there was seen a purple spot, which we found to be a clot of blood, of the size of half a Dhaler, shining through the dura mater, and there was, distinct from the intumescence of the dura mater, a tumor round, circumscribed, of the size of a wound egg, (the small egg which the hen has when she first begins to lay). The meninges covering this tumor were so delicate, that you could easily push your finger through them into the substance of the brain. The tumor contained a gross black fluid like boiled blood. This tumor had its seat betwixt the convolutions of the brain, in the center of the occiput near the falx, and it rested upon the roof of the ventricle: it seemed to *have a peculiar sac*, and to have distended the sub-

stance of the brain, the brain itself, where it surrounded the tumor, being soft, flaccid, and watery: in the left ventricle was a foul serum like the washings of flesh: in the right side, the brain was sound, and the ventricle natural, nor was there any token of extravasation anywhere within the cranium either of blood or serum; but universally the blood-vessels, going upon the convolutions of the brain, were remarkably turgid with blood."

It oftentimes happens that an individual case, by its very peculiar complexion and circumstances, throws a new light over all the preceding years and most perplexing occurrences of our practice. If ever there was a case of this decided cast, it is the one before us, where the dissolute habits, great stature, and fleshy fullness of the man were such as to imply predisposition, which his headaches after each debauch abundantly proved; where the heat and the laborious occupation he was engaged in at the moment of this accident, shewed what sort of impulse it was, which the vessels of the brain could not resist; where the slow injection of blood into the substance of the brain, brought on, gently and imperceptibly, the paralytic state; where the black and boiled appearance of the blood shewed that it had been for weeks effused; where the form of a sac, surrounding the tumor, shewed, even in the delicate substance of the brain, the effects of inflammation; where the perpetual pain shewed that the brain was actually and truly inflamed; and the universal fullness of the vessels shewed how slight an addition, (for there were no marks of recent effusion,) brought on those dreadful convulsions in which he expired: The size of the tumor proves in a great degree the insensible nature of the brain, in which at first he felt no pain; and entirely proves how little the senses or the reason are affected by partial injuries of its substance.

Observations on the effects of critical haemorrhages and critical days formed the rule of prognostic among the ancient physicians; they observed certain changes to follow certain discharges, or to happen at certain periods, in every febrile disease. The more complicated the sources of conjecture, the surer the prognostic; and our forbodings or our hopes are never so sure as when they are founded on pathology and dissection, on what is likely to happen, or what is actually passing within the organ. We perceive that every various degree of effusion of blood, should give a different prognostic, and have reason to believe, that certain signs indicate those various degrees. First, When the palsy comes on slowly, insensibly, and gradually, we have reason to believe, that the blood is either effused upon the surface of the dura mater where it may remain harmless, (the substance of the brain being inviolate,) and may indeed be animalized or absorbed, (as in cases of blows upon the head,)

then the patient may recover : or, the blood being slowly injected, and in a very limited quantity, into the substance of the brain, the destruction of its substance is so very slight, that the palsy, though irrecoverable, is deep, amounts to a mere awkwardness in using the arm and a lameness of the leg, but without distortion of features or wasting of the body. In such slow and partial extravasations, it often happens that the tongue recovers ; the articulation of words is correct, though usually slow ; the patient attains to write with the hand, but continues to move the limb by starts, as if it were moved by springs rather than by muscles under the command of the will. Secondly, When the palsy, in place of approaching thus slowly and gently, comes in the form of a paralytic stroke : when the patient cries out, falls sidelong, vomits, loses the use of his tongue, and remains stupid, staring, speechless, and with one side motionless for a day, we have every reason to fear that the effusion is of some extent, and are certain that the palsy is incurable : Then the patient, with obliquity of the face, faultering of the tongue, crookedness of the fingers, (curved towards the palm like a bird's talons) will forever trail the leg, will have a look of imbecility, with a real defect of memory and reason, eructations, loss of appetite, and wasting of the body. When there is a tremor of the paralysed or of the opposite side with convulsive twitches, however slight, the disease is more desparate ; but, if upon falling down, the patient struggles, foams at the mouth, is paralysed on one side, while he is convulsed on the other, or is bent back with universal convulsion, the extravasation is great and sudden, the brain is inundated with blood bursting through its substance or covering all its basis, death is inevitable. Finally, when we perceive a decided tendency in the habit to palsy ; when one impulse of blood has caused a slight extravasation and partial paralysis, and the succeeding strokes are attended with convulsions, or even with tremulous motions, there also the effusion is great, and the disease invariably fatal *.

* A man, aged forty years, being liable to a vertigo, from the intemprate use of wine, was seized with an apoplexy about the beginning of February 1703. Being immediately brought into the hospital of St. Mary de Vita, when I was there, as I used to be every morning, he appeared to be already somewhat relieved of himself. The physicians ordered his legs and his feet to be vehemently rubbed, spirit of sal ammoniac to be applied to his nostrils, and even some drops of it in a proper vehicle to be poured into his mouth, and blood to be taken away from his arm. The blood was taken from the left arm, on which side he was most affected with a paralysis. While these things were doing, the man was twice seized with a tremor, began to move his cheeks and his mouth, and to be seemingly more and more affected with palsy ; and slight convulsive motions presently ap-

Our chief difficulty remains, the difficulty of conceiving how a haemorrhagic effusion once begun should ever stop, or be any way resisted by the delicate substance of the brain; and it is a difficulty never to be removed, but by proving the fact. We may well and easily conceive how the adhesion of the dura mater to the scull may put limits to that ordinary effusion which arises from a shock or blow, and how even that extravasation which happens between the dura mater and brain might be repressed by the general fullness of the cavity; but that the force urging the vessels should be so great as to make them burst, and yet so gentle as to stop upon the slightest resistance, and form small and limited sacs of extravasation within the substance of the brain, is a thing almost incredible, were it not proved by very many facts. In a case or dissection described, with more than usual accuracy, by Morgagni*, we recognise the proofs of several interesting points of doctrine. First, That a woman, 40 years of age, that age in which the system becomes

peared on the right side, a more violent apoplectic paroxysm returned on the same day, which carried him off about the second hour of the night.

While the head was severed from the body, much blood flowed out, part of which came from the mouth. Then Valsalva said to me, this apoplexy, unless my observations fail me, was brought on by blood injuring the right side of the brain. In mean while, as we took off the common involucra of the cranium, we saw even the smallest blood-vessels of the periosteum to be manifest and distinct: yet we presently saw the small vessels of the meninges still more distended, especially through the left side of the pia mater; where besides, on the top of the hemisphere, there was some extravasated blood, which resembled the blackness of a contusion. But when we came to the lateral ventricles, I admired the truth of Valsalva's prediction. For though there was in the left ventricle some portion of extravasated blood, yet it was what seemed to have flowed there from the right. For in this last mentioned ventricle, there was not only a greater quantity of black and concreted blood, but also a great hiatus from whence it had proceeded, as if any one, with a large blunt knife, had penetrated through the external side of the corpus striatum and thalamus nervi optici, and had turned both of these parts over the fornix and the third ventricle. Other things which relate to the passage of the blood that was discharged from the mouth, you will find sufficiently explained by Valsalva.—*Morgagni, Let.* 3. *Sect.* 16.

* A woman, of forty years of age, and much given to drinking, was seized with an apoplexy. From this she became paralytic in both sides, and was brought into the hospital at Padua, and there she soon died. In her body, by reason of the unseasonable heat of the weather, for it was not yet the middle of March 1740, I scarcely examined any other part, in the hospital, but the head. The scull seemed narrow in its cavity in proportion to the length. There was polypous blood in the falciform sinus. The vessels of the pia mater *were so distended with blood, that the larger ones were almost black; and the smallest made a very beautiful appearance, as if injected with red wax.* The cerebrum and cerebellum were so soft, that the pia mater was easily drawn away from them by the hand. While I *cut here and there into the substance of the brain, not only bloody points and filaments appeared more*

more plethoric, and the menstruation is about to fail, much given to drinking, by which predisposition of the most dangerous tendency is incurred, (since there is both habitual fullness of the vessels and frequent excitement, affecting particularly that department of the circulating system), was struck with apoplexy; after the apoplexy, she became paralytic in both sides: it was soon after the apoplexy had thus terminated in palsy, that she died in the hospital of Bologna. Secondly, It is worthy of observation, that as nothing can be imagined more singular than a palsy of both sides, nothing can be more gratifying than the explanation of such a phenomenon; and in the dissection we find a perfect solution of the difficulty, for *both* sides of the brain were *partially* destroyed. There was found, in dissecting the brain, stringy and coagulated blood in the great longitudinal sinus, an accident neither unnatural nor rare: there was found such a turgescence and dilatation of the vessels, from their trunks down to their minutest branches, that they seemed injected with wax: the bloody points with which the brain, even in its natural state is speckled and dotted, were every where more frequent. These are phenomena inseparable from the apoplectic, and from every inflamed state of the brain; they are indications merely of the active state of its vascular system; but that some of its vessels had burst during the apoplectic impulse, is proved by the next established fact, for there was found in each

frequently than usual up and down, but in the medullary substance of each of the hemispheres a cavity was found. One of these cavities was small; and being situated at the external side of the thalamus of the right optic nerve, was of such a sise and shape, that it would just admit a *very small oval prune.* It was almost closed, unless that it was stuffed up, in some measure, with a brown gluten, or half-dried mucus. But the other cavity was in every dimension large, more especially in length; for it was produced to the whole extent of the left ventricle, lying upon its *external side, and full of blood,* such as I have already described in the porter (*n*); a small part of which blood had penetrated into that ventricle, and from thence into the third ventricle, two foramina having been made, reaching from that cavity through to the left ventricle, the one at the external side of this ventricle forwards, and the other backwards. The right ventricle, whose plexus choroides was somewhat pale, did not contain much water, and that was entirely free from blood. When I inverted the cerebrum, the trunk of that artery into which the vertebrals are conjoined, exhibited a small white elliptical spot; but, upon examination, I found it was not of that kind which is generally used to be the beginning of an ossification, as I had thought; but somewhat soft in the parietes of the artery itself, and rather in the interior coat; yet there was no prominence either internally or externally. Last of all, looking downward from above, I perceived the pituitary gland to be very low in the sella equina. And whatever I have here written, I demonstrated to many pupils who were present. *Morgagni, Letter* iii. § 6.

hemisphere, and within the proper substance of the brain, a cavity, partly filled with the remains of coagulated blood. The cavity in the right hemisphere was small. Morgagni seems to have fallen upon it by accident, in cutting irregularly into the substance, or (as the polite translator expresses it) " in cutting *here and there* into the substance of the brain ;" it was, in shape and size, such a cavity as might easily contain a very small oval prune, and was almost filled with a brown or half-dried mucus, the remains no doubt of coagulated blood : that of the left ventricle was long and large, occupying almost the whole of the hemisphere, ran along the whole length of the ventricle, and was full of blood. Nothing can be more interesting than the opposite characters of these two sacs ; nothing can better demonstrate the consequence of successive impulses of blood : First came one slighter paroxysm followed by a slight extravasation, a limited cavity, the blood absorbed, in process of time, till a brownish mucus only remained, and the consequence was a slighter palsy of the opposite side ; but a second paroxysm bursts (in the centre of the opposite hemisphere,) a larger artery, an apoplectic condition and a fatal palsy of the other side immediately ensues, and this cavity is found, upon dissection, to contain recent blood.

I cannot be too careful in establishing both the fact and the varieties of the fact ; for we occasionally find within the brain of those who have been struck with apoplexy, cavities full of recent and coagulated blood ; cavities half empty, but still occupied in part by the remains of coagulated and putrid blood ; cavities from which such blood had been entirely absorbed, the cicatrix only and a small hollow remaining to denote the injury to the brain : and sometimes we find in one diseased brain all the essential marks of successive strokes of palsy, ending at last in apoplexy, and sudden death ; of which perhaps the following narrative, in the words of Bonetus, will prove more interesting to you than any other I could have selected.

" A good woman, named Anna Oberhausen, wife of a carpenter of Geneva, of a full habit and fair complexion, of a sanguineo-phlegmatic temperament, nice and cleanly in her dress, aged 47 years, bore, at her first birth, three children, and had in all a family of nineteen ; always her labours were severe, and her lochiae profuse ; and, being but in straightened circumstances, her manners were frugal and careful. In the autumn of the year 1680, she suffered a severe paralytic stroke ; she fell down speechless, and was paralysed in her left side. Instantly upon being called, I had her bled in the arm, and blistered in various parts, and by frictions, and whatever else might help to recal the spirits to the extreme parts, and by purges I tried to excite the splanchnic nerves : By these means this woman, whose voice

was gone, and whose whole side was palsied, recovered so far as to speak, though imperfectly, and walk, though with a feebleness of the affected leg and arm. Thus far had she recovered on the 7th day; and in a little while she was, by God's grace, entirely restored, saving only a manifest weakness in the palsied side. After this she bore a thriving child, nor could we perceive that any principal function had suffered, except that, though formerly notable and careful in family affairs, she was now idle, prodigal, unthrifty, began to drink, and was beaten for these faults by her husband, who proceeded from quarrelling to blows, and such blows as left marks, by no means equivocal, of his ill humour."

"From hence forward she suffered much from headaches; from vertigo like that of drunkenness, so that at times she almost fell down; she was in the habit of frequent bleeding to moderate these complaints: by putting a seton in the nape of the neck, I restored this woman to her family and to her household cares. She went of her own accord to the baths to dissipate the remains of her disorder, but returned nothing improved in health; from cherry brandy she could not refrain, and she snuffed inordinately under pretence of curing the disease."

"In the harvest of the year 1685, during the vintage, when all ranks, especially the vulgar, are apt to indulge, during the flow of her menses, which prevented the usual resource of bleeding, she was struck with a deep apoplexy and died suddenly. On the morning of her death she rose as usual and went to her daily labours; one of her neighbours reported that she had seen her carrying a must-vat on her head; that she had complained of unusual lassitude, had staggard in walking; and in short, had been shrewdly suspected of being tipsey. That she had, upon her return home, complained grievously of cold, and was going up stairs to bed, when she was struck with the palsy, fell down in the stairs with a total abolition of the animal functions, and her good neighbours, alarmed by the cries of her little children, ran to her assistance, found her lying in the stairs in an indecent shocking manner, lifted her and laid her in bed. I was called (says Bonetus) and delayed not a moment to come to her; I found her limbs trembling as if shivering from cold, her breathing loud and irregular; no hollowing nor pinching could awaken her to the slightest sign of life or sense, though by continual irritation I could excite an irregular kind of trembling in any member. The pulse quick at first became soon slow, then feeble and languid; the breathing became also slow and oppressed: upon pouring a little fluid into the throat, it flowed in part into the trachea, and twice or thrice excited a slight cough, and upon coughing she raised her head from the pillow, but presently dropped

down again. Strong scents and volatiles having failed, I kindled sulphur nd held it to her nostrils, but she was expiring, and even this excited no signs of life: hardly an hour had elapsed from the moment of the apoplectic stroke, to that in which her breathing ceased, though her pulse continued to beat; and her jugulars, as I have observed, in all those who are suffocated by the stagnation of blood in the lungs, were strangely agitated. But the pulse also gradually declined, became slower, weaker, stopped, ceased; and about ten in the morning she expired.

" At six in the evening the head was opened: upon dividing the scalp with a crucial incision, and tearing it from the scull, a serum flowed from the cellular substance, and a thin and watery blood from the vessels. Upon separating the cranium from the dura mater, innumerable guts of blood exuded, especially from the place where the falx adheres to the occipital ridge: Though over the right hemisphere the dura mater was cut with a knife, no serum nor blood exuded, nor was there a single drop of either extravasated betwixt the dura and pia mater. Now, for fear of interruption from the friends, I raised the brain from the scull by dividing the nerves and arteries, and carried it, surrounded by its pia mater, away, filling the scull cap with ashes to prevent the blood of the jugulars and sinuses regurgitating into the cranium and betraying the theft."

" Outwardly nothing seemed amiss in the brain; its surface was entire and sound, the sole peculiarity was a universal redness: In the veins leading towards the longitudinal sinus, I found air only, which I pushed along with my finger into the carotids: I injected wax of a brilliant green colour, which, without entering the cerebellum, pervaded all the arteries of the brain, and transuded through the wound of the dura mater. Seeking for the cause of the apoplexy, I cut downwards, with a slow and cautious hand, through the right hemisphere of the brain, till I reached the ventricle; and in the posterior part of this hemisphere behind the ventricle, I found a small oblong cavity, empty or nearly so, containing only a small quantity of stagnant humour: both this cavity and the surrounding medullary substance was of a brownish or yellowish colour, cut with difficulty, and seemed to have been long in this callous and hardened state. In the same hemisphere, and exactly at that point where the carotid branches cut into its various ramifications, I fell upon a similar cavity in which also a little of a serous exudation stagnated, and like the first it cut difficultly. Under the corpus striatum of the right side of the same hemisphere, I found a third cavity, resembling the two former, gaping at first, but its sides immediately collapsed, and adhered by a viscid mucus, but were easily separated again

so as to show the cavity, which, like the two former, was yellow and hard to cut. The right ventricle was full of a serous blood, part of which had overflowed into the left ventricle, having burst through a slit betwixt the Thalamus Nervi Optici and the Corpus Striatum; and in the center and substance of the Thalamus, the blood, bursting into the medullary substance, had formed there a large slit or cavity, which I found occupied with a coagulum of blood as large as a pigeon or hen's egg; and having washed the brain thoroughly, I found that the rent in its substance extended, ragged and irregular, quite to the root of the optic nerves. The right corpus striatum was neither so fresh nor firm as the left, but yellow flaccid, and as if wasted. The plexus choroides were sound, except that the right one was firmly glued to the first or uppermost of these cavities."

In this most interesting case, all the principles I have laid down are illustrated, and all the descriptions I have given are fulfilled. A constitution manifestly predisposed being assailed by irresistable impulses, successive effusions examplifying all the stages of extravasation and all the consequences; first, partially causing palsy, next, of great extent, and proving fatal. This Anna Oberhausen was of a full habit and fair complexion, and of a sanguineo-phlegmatic temperament, by which expressions, Bonetus means no doubt to describe a woman above the middle size, lusty, fair, and full of blood, arrived at her 47th year, a period of particular danger *. Recollect that each menstrual period is accompanied with a more vigorous action of all the system: that it is during the menstrual period, that hysterical or convulsive paroxysms recur; that tumors get an increase of size; and such period, and varices bleed afresh; that the cancerous breast is affected with particular pains and an increase of swelling; that ulcers are angry and inflamed; that periodical headaches or vertigo are aggravated; that the slightest accident of fever, cold, or alarm or fatigue brings disorder upon the system; that all the blood vessels are in so active a state, that often haemorrhages burst out from the nostrils, the stomach, or even the surface of the skin, and especially from ulcers and varices, so as to usurp the place of menstruation. The tendency of this function, superadded to the female system, plainly is to accumulate blood; and in consequence of menstruation, an indolent life, frequent child bearing, and profuse lochial discharges, obesity and an apoplectic habit are extremely frequent with women, especially at that period in which the menses are to cease. The irregularities of menstruation are thus the cause of hysterical disorders in youth, of head-

* « Inclinant utique in sanguineam apoplexiam, sanguineae feminae, desinente mensiam fluxu."—*Hoffman. Epicrasis, Case 2d.*

aches in the middle of life, of madness after child-bearing, and of apoplectic, vertiginous, and paralytic affections towards the wane of life; nor can we suppose a subject more exposed to those disorders than this Ann Oberhausen who, with a sanguine and plethoric habit, had born nineteen children in all, had always profuse lochial discharges, and had once born three at a birth *.

A poor and laborious woman of her low condition, must have been herself unconscious, and her friends inattentive to the preceding symptoms: when first struck, she fell down speechless and paralysed in one side: to this period, must we refer those three lesser cavities, or cavernulae as they are called, which were found in the substance of the brain. "Causam flacciditatis Corporis Striati prope spectare licuit: *Tres nempe cavernulae jam olim factae*, nunc quasi clausae et cicatricae obductae circumcirca corpus striatum apparuerunt." At this first impulse, the brain had surely suffered that kind of extravasation so frequent in other organs, so fatal in this; a general impulse of blood in its vessels, perhaps a suffusion of blood throughout its substance, but certainly direct extravasation in three distinct places, surrounding the Thalami Nervorum Opticorum and the Corpora Striata; in short, about the basis of the brain: In any less particular organ, or even in this, had such extravasation happened betwixt the scull and dura mater, the blood would have been partly absorbed, partly animalised, and the cellular substance thickened, the surfaces adhering again, and thus a temporary palsy would, as in cases of concussion or blows, have been followed by a complete recovery. But in the brain, though the blood was in part absorbed, the cavities could not be completely obliterated. The half empty sacs, the callous walls of the larger cavity, the brownish or yellow colour, the induration of the medullary substance of the brain, are the evidence of the original state of effusion, and prove to us another most important fact, that such trivial damage of the medullary substance is not absolutely and essentially felt throughout the system; that it is possible, where the effusions are limited, to suffer a complete palsy in the moment of effusion, while the impulse which causes, and the extravasation which completes, the paralytic state are both operating on

* "Instante nimirum menstruorum fluxu, tota massa sanguinea effervescente et agitata, postquam pridie plusculum sese invitaverat, venaesectionem quae saepe saepius opem tulerat, et forsan graviora mala averruncarat differre coactu fuit."—*Bonetus*, p. 143.

So that Bonetus found reason to ascribe even the immediate stroke partly to the present menstruation, partly to the neglect of an accustomed bleeding.

the brain, and yet to recover the use of the tongue, the arm, or the leg, along with a tolerable degree of health: but still we see, as in this case, marks denoting the injury in the brain, in loss of memory, and indifference to the affairs of life.

For five years this woman enjoyed a degree of health, but drinking, quarrelling, child-bearing, and the natural progress of the constitution towards decay, increased the predisposition: Headaches and vertigo, like the staggering drunkenness, mark this revolution in her health *: and in the heats of autumn, during the indulgences and labours of the vintage, in the moment of carrying a must-vat upon her head, she is seen staggering, is suspected of intoxication; is found lying in the stairs, in an indecent attitude; not in a state of apoplectic stupor and snoring, but cold, trembling, paralytic, with an intermitting pulse, and a slow respiration,—and so she expires. In this last effusion the vessel which has given way is considerable; the blood bursts into the center or medullary substance of the brain, within the thalamus or medullary tubercle, which forms the chief part of the basis, and which gives origin to the optic nerve; the clot of blood extending to the root of the optic nerve, is as large as a pullet's egg, the extravasation proves inevitably and almost instantly fatal †. Less interesting cases I will not here detail but commit to the margin the notes of two cases,

* It is right to remind my reader of the nature of vertigo, which precedes or follows all severe affections of the head, and is the first proof of disordered circulation; nor can I represent this better than in the words of Van Swieten.

"A vertigo is almost the slightest of all disorders of the brain; and the greatest part, if not all disorders in the head begin with it; and in their cure, they generally leave a vertigo as the last symptom. In every vertigo there is generally an apparent rotation of the external objects near us, though they are actually at rest; and sometimes the things seem to be tumbling down from on high, or the reverse. When the disorder increases, objects begin to appear variously coloured, and soon after follows a vacillation or incipient inactivity of all the muscles: then the patient thus affected being afraid of tumbling, lays hold of any thing that offers, to support himself; but the body becomes in an instant so weak all over, that the patient falls down, and his sight wholly vanishes in the most obscure darkness: and this is the last symptom of which they are sensible; for, if the disorder continues, it terminates either in a deliquium, epilepsy, or apoplexy."——*Van Swieten, p.* 373.

† "Fortissimae denique et lethalis apoplexiae causas sequentes observavi. In ipsa substantia medullari, seu meditatio cruris dextri, amplum hiatum seu fissura, et in hac sanguinem concretum, ovi Columbini aut Galinacei magnitudine inveni; superius rimam egit erus medullare, per quam sanguinis concreti pars serosior, in omnes cerebri cavitates effusa, easdem opplevit, et oppilavit Alibi arteriolas aegritudine affectas conspicatus sum in ipsa medullari cerebri substantia quas sanguinem enmisse facile colligere licuit.—*Bonetus, p.* 143.

one by Morgagni, accompanied by a dissection, less accurrate or conclusive than this, and one transmitted to him by Rimini in the year 1721, by Jan. Plancus *,

* *A Venetian woman, aged fifty-five years, of a florid countenance, a large stature, and a full habit of body,* was subject to violent pains of the cholic. This woman, besides, had, ever since a certain time of her delivery in child-birth, (for she was the mother of many children) grown so prominent in her belly, that she was thereby prevented from going about most of her domestic offices, with promptness and expedition. On account of these complaints, *she said she could not bear to drink her wine diluted; she therefore drank it in a pure state, and that not sparingly. She was now slothful, dull, and inclined to sleep;* and for some days past, this symptom also had attacked her, either for that reason, or because her head was in pain, that she heard a very troublesome noise, of which she often complained. At length, about the third hour of the night, she said she was very ill; and mentioned particularly a pain in her right temple and right eye; and while she was sitting down on a chair, and asking for assistance, she was seized with an apoplexy, in consequence of which she fell on her left side; but the motion of the right hand *was not lost till an hour afterwards.* At the same time, *she threw up from her stomach* the wine which she had drunk that day, though the quantity of it had not been greater than usual: but her exertions in vomiting were very weak and feeble. I don't find she had any more assistance than that of being put into bed, where she began to have a stertor; and though she certainly lived till the sixth hour of the night, yet in the morning she was found dead and cold; so that it was conjectured she died about the ninth hour. The weather was now extremely cold, for it was before the middle of February 1708.

I dissected the body, in conjunction with that excellent anatomist Jo. Dominico Santorini, other learned friends being present. The abdomen was turgid, and rather abounded in fat, as did the omentum also. Almost the whole colon was in a manner like that of a dog, &c.

Before we opened the head, we observed a large spot, of such a kind, about the mouth, that we doubted, whether it *was from the wine that had been brought up, or whether blood also had come with it. The mouth itself, which certainly had not been observed in the first hours of the apoplexy, was distorted to the right side;* nor was it the effect of a convulsion; for, besides that the limbs and neck were very flexible, I reduced the mouth to its proper place with my hand; the parts easily following without any force, and remaining where they were placed; so that the paralysis of the face seemed also to have happened on the left side. Having cut through the cranium, which we thought was thicker than usual, we immediately saw blood to be extravasated beneath the dura mater, and to be shining through its substance. And that blood, as we perceived by dissecting farther, covered the whole right hemisphere of the brain; for it even lay under the basis of the brain, and was formed into one continued lamina every where. This lamina being removed, not only the *sanguiferous vessels of the pia mater, both in the left and right hemisphere, were found to be more turgid than usual* here and there; but we also perceived two or three foramina in that part which *covered the outer side of the right hemisphere, from which the blood, we have spoken of, issued out betwixt the two meninges.* For these foramina led into *a certain large and longitudinal cavity, formed in the medullary substance of the same hemisphere, between the external side and the lateral ventricle,* so as to be equal to two fingers breadth in width, and in length to six or more. This cavity was contained within unequal, *and almost eroded*

and hasten to conclude my remarks on the paralytic state of the brain, by a few observations on a subject in which, I am sensible, my narrow limits will not allow me to indulge, I mean those paralytic affections which seem local, without being truly so.

By Local Palsy, I mean not incapacities proceeding from pressure upon particular nerves, such as are often observed in surgical disorders; these I shall take occasion to describe in Cases and Observations which it is my intention to publish soon. I mean now to speak of Local Palsies which no pressure can account for, which must proceed either from a mere affection of the part, or from a disorder of the brain. Often we find the tongue paralysed, the cheek distorted, the side of the face benumbed, or the eye-lid affected, by the patient being exposed to a chilling north wind: We should hardly think of ascribing a palsy, so purely local, to any affection except of the part itself, but I am persuaded such affection of parts have a connection with the brain, from a phenomenon which I have very frequently had occasion to observe: a person often has irrecoverable palsy of one side of the face, from a cold, from a common catarrh or rheum, and it happens thus: The patient, (generally advanced in years,) has got a rheum or common cold; the serous discharge from the nostrils, the gravid or loaded feeling of the head, the dullness or stupor are often accompanied with erysipelatous inflammation, and that again with a slight degree of delirium, especially during the night: after six or eight days of

parieties; it was full of a grumous blood, and had a communication with the right ventricle towards its posterior part: by means of which communication, a small quantity of blood had been poured into that ventricle, and a small portion had even passed over into the left, by breaking through the posterior part of the septum lucidum: but the blood had formed itself into a laminated concretion in each of the ventricles. It seemed, however, that some other vessel also must have been ruptured, since a lamina of blood was found below the transverse process of the dura mater, covering the whole cerebellum, though of a moderate thickness.——*Morgagni, Letter* iii. § 2.

"A few days ago we dissected the body of that man who consulted you last June, at Padua, upon a hemiplegia, which had rendered lame his left side, from a violent fit of palsy. Yet he did not complain of disorder, but from a dilatation of the heart and precordia, which you, from the remedies you so aptly prescribed, seem to have been sensible of at that time. But the right hemisphere of the brain, towards the temple, seemed to have been eroded with a kind of abscess; for there the substance of it was wanting to about four inches in breadth, and an inch and half in depth. And the Thalamus Nervi Optici, on that side, was less by two-thirds than the left: besides it was of a dun yellow, and appeared to have been closed by a cicatrix."

suffering, the fever subsides, the swelling gradually vanishes, but the tongue continues affected with a degree of palsy, the cheek too is benumbed, the eye-lid has fallen down, and the eye itself is oblique, is usually turned inwards, and the vision is lost. Such a disease I can have no doubt of referring to the brain itself; for though external inflammation might thus affect the cheek or tongue, swelling of these parts leaves behind it no degree of palsy; and such external affection could never reach the muscles of the eye, much less produce a palsy of the optic nerve: Yet one thing is I confess perplexing, that such local palsy happens always on the side affected, as if some thickening of the cellular substance or coats of the nerves injured the nerves betwixt the organ and the brain, unlike that palsy proceeding from injury of the substance of the brain, which affects always the opposite side.

Local injuries are sometimes so oddly mixed with palsy proceeding plainly from the brain, that were the physician not aware of such phenomena, he would naturally prescribe local remedies for a disorder of the foot, when his chief care should be to prevent accumulation of blood within the head.

"A gentleman whose case was communicated from the country, by his family surgeon, in a succinct and judicious narrative, was fairly advised to beware of his manner of living, to regulate his health according to the strictest rules, and to attend to the state of circulation within the head, though the original injury was in the Tarsus, and the pain, the trembling, the sense of confusion, which terminated at each paroxysm in the brain, seemed to begin in the foot, and could be traced along the leg. This gentleman was about the middle age, of low stature, full habit, and plethoric system, with a short neck, large head and shoulders, and plainly predisposed to palsy, yet enjoying perfect health. One summer's day in travelling in a post chaise, the horses in going up hill, either backed or otherwise endangered the overturning of the carriage, when he, with the improvidence so usual on such occasions, threw open the door, leaped from the carriage, and hurt his foot, by alighting with all the force of the leap upon a big round stone, which was received in the hollow of the Tarsus, and with such a shock that it was feared some of the bones were displaced. For three years from this unfortunate and very violent strain, he has always suffered more or less from the injury of the Tarsus, in which the pain and swelling were so great, that it was long believed, that, with a violent strain of the ligaments, some of the bones were actually fractured or displaced. During many months he was entirely confined; he was still longer lame

and disabled: Topical bleedings, sedative applications, and rest, brought at last the usual relief; though, lame, weak, and easily fatigued, he finds that the pain of the foot has much abated; the swelling is entirely gone.

"Within the last eight months, there has ensued a train of symptoms differing very widely from those of local disease: once a day, sometimes oftener, he is seized with a sort of paroxysm accompanied with sensations difficult to be described; the disorder is first felt in the foot, in a painful, tremulous, and benumbed sensation, which diffuses itself along the limb, affects the whole of that side of the body, and finally terminates in the head, accompanied with severe pain there, and a confusion of intellect, and a sense of feebleness, so great that he is glad to lay hold on any thing for support, but never falls, nor loses his senses, nor becomes epileptic: in a few minutes the sensation is gone. These paroxysms never afflict him while in bed; but are at times more frequent, independent of any sensible cause, and are invariably so when he is wearied and irritated: Since these paroxysms have begun, the leg, growing sensibly weaker, is now plainly paralytic, he makes a step with it more difficultly than formerly, he moves it by starts as if hinged with springs, and he carries it round in a semicircle at each step."

"No two complaints can be imagined more distinct, yet none are more in danger of being confounded than those with which this gentleman is afflicted; nothing could be more extravagant than to suppose them an affection seated in the tarsus; had (in the third year, and after a gradual progress of eight months,) extended at last to the head, and, through that, affected half of the body with palsy. No mistake can be more common, more unphilosophical, than to ascribe epilepsy to some local affection, which superficial reasoners imagine they trace from the affected part up to the brain, by the tremulous motion along the limb: yet with as much truth might it be affirmed, that epilepsy is usually caused by an affection of the eye, because, from the peculiar state of excitement in the brain, the patient has the strong sensation of seeing a fiery beam of light, or a sudden flash preceding each paroxysm, till he at last recognises this terrifying appearance as a sure sign of an approaching convulsion, and a signal to lay hold on something for support: with equal truth might it be affirmed, that the man who has had his limb amputated, is still possessed of a foot and toes, because he feels pain alternately in each toe, and can hardly be persuaded, even by feeling with his hand, that they are not still existing: such sensations are only in the brain; such nervous disorders as we have just described are also in the brain; a part wea-

kened by disease, and irritated by pain, is more easily affected, there the first tremulous motions are observed, in that extreme part does the convulsion apparently and indeed really begin, but its cause is not in the part. The ignorant are inclined to hope for a cure by caustics and issues applied there, and hold fast the part, or screw tourniquets about the limb to prevent the convulsion being propagated towards the head, but with such ill success, that by these unwise attempts to arrest the convulsion, while the whole body of the patient is stiffened, and he is staring with agony, the paroxysm is hastened to its acme: While the patient retains sense and consciousness, and long after he has lost the power of speach, and can only see and hear, while he is stiffened and staring in the increasing convulsion, but unable to express what he feels, his greatest wish is to have such cruel assistants refrain from screwing or pressing down the limb, which aggravates the torture. That in this gentleman the affection of the brain is more likely to reverberate upon the weakened limb, and be felt there in a painful trembling before it is recognized by pain and confusion of ideas, is much more likely than that any accident so common as a sprain, so long mending, and now so little painful, should affect, first all the body, (at least one side of the body,) and create daily paroxysms attended with confusion of intellect and darting pains in the head."

"The injury of the Tarsus had no farther share in this new disorder than by operating as a cause of confinement, as an occasion of ease and indulgence, as an interruption of the usual exercise, unaccompanied with any proportional abatement of the appetite or assimilating powers; it was from these consequences of confinement that this gentleman, of a habit conspicuously inclined to plethoric, is now peculiarly gross and full, with black strong hair, a glossy skin, a full round face, and prominent eye. By this sedentary life he has made much blood, and is in manifest danger of a compleat apoplectic stroke: his body is full, the affected leg emaciated, his arm not so useful, his face slightly distorted, his eyes languid and heavy, and his enunciation slow and difficult, as if his tongue was too bulky for his mouth. The body in all its motions inclines towards the sound side, the paralysed leg and arm being always advanced more forwards; he does not step with the leg direct and fair, as if it were fit to move itself or to support the body firmly, but carries it round in circles, and moves it with a start as if hinged and put in motion by springs: he inclines the body towards the other side, while he swings the palsied leg round, and puts it down with so little governance of the joints, that the shock agitates the body. Why, in short, should I describe what you all know, and I may express in one plain word, he is manifestly though slightly paralysed in all the

affected side, and I have, in consultation with Dr Monro, advised the strictest abstenance and care. First, we have expressed our decided opinion that the Tarsus is neither laxated nor fractured: Second, we have expressed our persuasion that the local injury has in no other shape contributed to this general disorder, to those frequent paroxysms, to this paralytic debility of all the left side of the body, than as an occasion of languor and inaction, and as a temptation to indulgence: Third, we have confidently ascribed his pain, vertigo, general debility, and paralytic lameness, to a still increasing fullness of blood which he must be careful to repress. Fourth, we direct his whole attention not to the weakened member, but to his general health, to the peculiar fullness of his habit, by abating which he may prevent the most distressing consequences. We have suggested to him upon the slightest increase of pain in the head, or vertigo, or sense of fullness, or more frequent paroxysms, to be bled or to apply leeches to the temples: to apply a blistering plaster over the pained part of the head: to put a seton in the nape of the neck, and to persevere in this severe but most necessary remedy: we have directed him to restrict himself in diet, which must be at once cool, sparing, and consisting chiefly of vegetables, of soups, bread, milk, whey, with a small bit of meat at dinner only: we have fordidden him to taste spirits, ales, or other fermented liquors, contenting himself with a glass of small-beer at dinner: we have advised him to avoid late hours, crowded rooms, public assemblies, violent exercise, altercations, or intense application of mind, whatever might agitate or hurry the circulation: we have directed him to sleep in a cool and airy room on a hair mattress, with the head bolstered high with pillows, and not to indulge in sleep: to pursue a regular course of exercise, walking, or driving in the gig: to avoid damp weather: to preserve the bowels always open with laxatives, and to take occasionally, upon feeling heavy or oppressed, a smart purge.

ILLUSTRATIONS OF THE LETHARGIC STATE OF THE BRAIN, OR SEROUS APOPLEXY.

WHILE apoplexy is proved to be a sudden arterial impulse injecting the whole veinous as well as arterial system of the head with blood, and palsy a sudden yielding of vessels under that impulse, accompanied with effusion of blood upon the surface, or within the substance, or into the ventricles of the brain, Lethargy, Serous Apoplexy, is found to arise from serous effusion proceeding from slowly increasing congestion of blood and languid action of the veinous system of the brain.

It has ever been my wish, not only to instruct you in the knowledge of diseases, and to lay before you such plain unsophisticated reasonings as experience and reading suggest, but to bring you acquainted with the stile and manner of every conspicuous writer in our profession, to instruct you how to read his works, how to judge of his opinions, how even to receive his facts and narratives, for all are not equally to be confided in. This Somnus Praeternaturalis, this Sopor Insatiabilis, as it has been defined, has been a subject of deep and philosophical investigation with the celebrated Willis; and though nothing can be more obvious than that it depends simply on a serous effusion slowly increasing, and supporting a continued uniform pressure upon the brain, nothing can be more profound than Willis's definition of the cause. If this which I am now to recite, this insipid harangue about animal spirits and the corporeal soul, be pathology, (as Willis's book is entitled Pathologia Cerebri), no wonder pathology has gone into disuse. Willis also begins in the manner of Polonius, "To say what stupor is, we must first say what sleep and oblivion are, and of the first of those we have given already a full and clear account; for the essence of sleep consists in the corporeal soul abstracting itself for a while, and contracting its sphere of irradiation: First, it abandons the cortical cineritious or external substance of the brain; but in a little while the external senses also and the organs of motion feel themselves forsaken of the animal spirits: The corporeal soul thus retired into the interior of the brain, indulges itself in rest and quiet, while the pores on all the circumference of the brain, no longer traversed by the going to and fro of the spirits, and empty at the same time of nervous fluid, are open of course to the influx of whatever spirits may be anew secreted from the blood: Thus is it wisely ordered in the regular state of sleep, that at one and the same moment the spirits retire from the surface, and the nervous secretion enters into the pores; but in unnatural and disordered sleep, these relative motions are all disordered, now this way, now that, sometimes the outward, sometimes the inward motion taking place: sometimes the spirits, wearied and wasted, suddenly retire, and cause a reflux of the nervous liquor; or, the relaxed pores, inviting and attracting the nervous humor, its profusion repels and inundates the spirits. The many and various modifications, the particular ways and modes in which these things happen, we shall presently define; but in the meanwhile there can be little occasion to speak more of oblivion or loss of memory, since it is nothing more than insatiable sleep, viz. The expulsion or exclu-

sion of the animal spirits from the pores on the exterior of the brain being filled by some tremor *."

With such a piece of philosophy for the ground doctrine, all the reasoning on the diseases of the brain must have one uniform complexion; all its affections must be attributed to the imperfect concoction of the nervous fluids and animal spirits, to the inconstancy of their flux and reflux, to superfluous serum, or to corrupted serum driven outwards when it should stay within, or to various malignant and villanous humours mixed with and polluting the purer spirits. The cause of lethargy is plainly defined by Willis to arise from "Humours too abundant or incongruous, congregated within the pores of the cortical substance of the brain."

Let us take a humbler strain, and judge of the causes of lethargy, not from what may be passing in such invisible pores, but by what we plainly see in dissection. Willis would have acted more wisely both for the improvement of science, and for his own reputation, had he confined himself to the enunciation of great and leading facts in the plain unaffected language he has used in another passage: "I have often in dissection observed that lethargy proceeds from a serous humour surrounding the convolutions of the brain, and occupying its cortical pores; for in many of these dead of this disease, I have found not only the interstices full of a limpid serum, but its very substance softened by the moisture, the whole brain being not merely dropsical, but drowned in water.†

* Attamen de *priori* horum supra disserentes, ostendimus *somni essentiam* in eo consistere, quod *anima corporea* se paululum subducens, et irraditionis suae sphaeram contrahens, imprimis extimum cerebri ambitum, sive corticem ejus, et dein exteriora quaeque sensus et motus organa, spirituum emanatione destituat, et quasi fores occludat; proinde ut illi refectionis gratia intra revocati succumbant, et quieti indulgeant; interim *cerebri exterioris* pori, et meatis à spirituum excursibus immunes, et vacui, *liquori nerveo*, è sanguine pro novis spirituum copiis extillato aditum praebent. In *somno naturali* et assueto, binae hae concausae; tanquam ex naturae pacto quodam mutuo conspirant, et simul contingunt; scie. eodem tempore spiritus recedunt, et humor nerveus subintrat: in *somno* autem *nonnaturali*, sive extraordinario, causa interdum *haec* et quandoque *illa* prior est; nam vel spiritus defessi, aut avocati, se prius subtrahunt, et humori nerveo prae foribus aggesto introitum praebent, vel humor nerveus uberior loca ista adpellens, et quasi vi viam faciens, spiritus repellit eorumque meatus subiens, quasi inundat: utriusque horum varias occasiones, et fiendi modos particolatim assignavimus. De *oblivione*, sive *memoriae eclipsi*, vel defectu, non est ut multa *hic* dicamus, quoniam eadem omnino hujus, ac *somni immodici*, causa est, nempe *spirituum* animalium, ab exterioris cerebri meatibus, humore quodam plenis, *exclusio*, et commeatus pro tempore interdictus.

† Lethargum a serosa colluvie cerebri anfractus exteriores alluente, ejusque poros et meatus corticales subeunte, interdum oriri, OBSERVATIONE ANATOMICA SAEPIUS COMPROBATUM VIDI: In multis enim

Apoplexy and Palsy are the diseases of manhood, and are most frequent in the prime of life: Serous Apoplexy is the disease of old age: Apoplexy and palsy consist in sudden and impetuous actions of the arteries of the brain: Lethargy proceeds from a slowly increasing congestion in its veins, and consequent exudation upon all its surfaces: In apoplexy, the mind and senses, in palsy the body and voluntary motions, are suddenly affected; in lethargy, there is a milder affection of both, slowly increasing, in which there is debility but no direct palsy, torpor but no absolute stupor. Lethargy is distinguished from Hydrocephalus by absence of pain; from Typhomania by absence of delirium; from Apoplexy by the absence of stupor: It is a loss of memory, languor and indifference to all usual concerns and interests; a listlessness and torpor gradually increasing, till at last the patient slumbers perpetually, falls asleep in whatever posture you place him, at table, in company, in the midst of the most interesting business; forgets what he meant to say, and though excited again to speech, again forgets what he designed to say; he slumbers continually, is difficultly roused, and answers but with monosyllables, till gradually all the functions fail, and he becomes entirely insensible, vomits frequently, and dies slightly convulsed, or completely oppressed; yet it is an oppression unaccompanied, like that of apoplexy, with deep stertor: the pulse is throughout weak and languid, the face pale, and the body cold, the intestines torpid, and all the secretions (except that of a pale and insipid urine,) suppressed; when the patient dies, the dilatation of all the veinous system of the brain, and the universally increased exudation on all its surfaces, are so equally conspicuous that we hardly know which to suspect as the principal cause of death.

In investigating this state of the brain, we are not to look for any very direct and immediate cause, but are to consider those slow imperceptible changes, which advancing years, and indulgence in idle and luxurious habits produce, altering slowly the condition of the brain; it is the slow destruction which time alone, or, in other words, the gradual yielding of the vessels, under perpetual action, brings about, independent of the various imprudencies in our mode of life which forward the decline of nature: It is, I believe, a just and natural view of the subject, to say, that lethargy, or the

ab hoc morbo defunctis, plicarum cerebri interstitia, aqua limpida repleta, quin et extimam ejus substantiam, a nimio madore mollem et minus firmam: Insuper in nonnullis cavitates interiores lympha turgentes, et totius cerebri compagem, hydrope, seu potius diluvio inundatam reperi.—*Willis, page* 294.

apoplexy of old age, is the same dilatation and loss of action in the vessels of the brain, which gradually undermines the structure in other parts of the system, but no where with such important consequences: what leucophlegmatia and a varicose state is in the limbs, the serous apoplexy and veinous congestion is in the brain.

The whole fabric of the body consists in its blood vessels, its chief bulk in their fluid contents, its health and vigour in their sound and well proportioned action: In all parts of the body, the arterial actions are gradually prevailing over the resistance of the veins; and when, in the wane of life, the body begins to decline in strength and decay in substance, the change is every where denoted by the yielding and dilatation of the veins: this is at once the mark and the cause of the decline in the limbs. That those changes take place in the brain or other internal parts, we infer from symptoms, or discover after death: In a limb the dilatation of the veins is followed by an imperfect absorption, an infiltration of serum into the cellular substance, a thickening and swelling of the whole member, and ulceration at last: the patient drags on life, with such disorganization slowly increasing, in the limbs, in the spleen, the liver and other less important viscera: but in the brain, that dilatation of the veins which disorders its circulation, that imperfect absorption, which may be compared with the leucophlegmatic state of the limbs, does infinite harm; that disorder which thickens the cellular substance of a limb, because it can dilate, wastes and injures the substance of the brain, because the cavity in which it is placed is unyielding. With this slowly increasing compression, this new and unhealthy state of the brain, all its functions must fail; to slowly increasing compression, as in the slow growth of tumors, or in the hydrocephalus of young children, in which the brain is almost annihilated, we find it yields without the vital functions, or even the voluntary motions, being essentially injured; yet these are ultimately fatal: they are fatal as the serous state of the brain is, by producing torpor, paralytic debility, and slighter convulsion; and we have daily proofs that even the most gradual and slightest changes on the texture of the brain, have their effects on the memory, the judgment, and the general health. I know no disease in which the very peculiar symptoms, and very peculiar appearances on dissection, are so inseparably connected as in serous apoplexy: torpor, languor, loss of memory and intellect, occur in various affections of the brain, but never unaccompanied with delirium, with pain, with fever, or some other peculiar character of disease, except when it proceeds purely from the serous state. "A courtier of distinguish-

ed rank, (says Wepfer) and a prime minister, had for many years running ulcers, which had never been healed up, but were unadvisedly stopped in his old age: he was, at the age of sixty, afflicted with melancholy, on some occasion of favours and preferment ungraciously refused him; and in no long while, his domestics could perceive that his memory and judgment were both impaired: in the midst of a discourse, he stopped, forgetting what he had said, or what he designed to say; often he continued during three days in this condition, and then recovering his recollection, began where he had left off the preceding days, and finished, without stop or hesitation, the directions he had then begun to give. These interruptions of memory and reason were remarked from period to period, till in process of time his memory and reason were manifestly impaired; and at the end of half a year, he fell into a deep sleep, which lasted, without stertorous or noisy breathing, thirty hours; he died placidly."

"He never was heard to complain of headache, vertigo, or singing of the ears. The scull-cap being raised, a profusion of serum flowed out, insomuch that it might be moderately estimated at a fourth part of the whole contents of the cranium; vesicles were also observed in all parts of the surface of the brain, full of limpid serum *."

This I relate to you as a neat, and short epitome of this disease, which consists not in stupor, for the patient can be roused, but in mere somnolency, free from pain, delirium, fever, or any other symptom, unless it be sometimes, a slight vomiting from the affection of the brain, sometimes, a slight degree of paralytic trembling, or of actual palsy: the patient labouring under serous apoplexy is overcome with sleepiness, and incessant yawning, but, though he sleeps in all postures, and in the midst of the most interesting occupations, he can always be roused; though indifferent to his affairs and duties, his senses and faculties continue long unimpaired, and are exerted when roused; but the deep insensibility, which resembles that of apoplexy in all but the stertorous breathing and inflated visage, is only of a few days duration, and prognosticates death. Upon dissecting the brain its veins are found choaked with dark blood, and the ventricles and surfaces inundated with serum.

So little do we know of veinous absorption, or even of arterial exudation, that no prolixity of inquiry could carry us at all deeper into the philosophy of this disease. But its slow progress, and the causes which lead insensibly to this condition, are highly worthy of your attention. We are not, as in other affections of the brain, to look for any very immediate excitement, but to those habits of indulgence and idleness,

* Wepfer, Observatio 96. intitled "*Sopor funestus a colluvie serosa cerebri.*"

to those peculiarities of natural conformation, which predipose to this state; and it is a material point of my duty, to remind you how difficult it is to live in health, how much fortitude and self-denial is required to struggle against indulgences once become habitual, to live a hardy and active life, to maintain health and clearness of head, along with nimbleness and vigour of body.

The approach of old age is marked in all the visible parts of the body by dilatation of the veins, as in the lean hand and bald temples; its effects upon the internal viscera are known by languor of the circulation, and the imperfect performanee of the functions; but when to this natural decline are added luxury, indulgence, and a torpid and sedentary life, the veinous plethora advances rapidly, and diseases of the head are, next to swelling of the limbs, the most conspicuous effects of old age. Plethora, fullness, loaded with fat! forgetful, stupid, torpid, lethargic, are ideas and expressions so inseparably connected, that there cannot but be much truth in the observation on which those proverbial reproaches are founded: Look to the habit of a sailor, a soldier, or a slave; compare it with that of a citizen, a pampered man of wealth, or his cook or porter! in the one you see marks of irresistable predisposition to disease; in the other, alacrity, vigour, and health. In a whole fleet or army, where spare diet, and regular hours, and constant labour are exacted, there is not one man of that gross habit; not one fat, bloated, feeble, giddy, nervous; none apoplectic, except from intoxication, nor subject to those maladies of the nervous system, or distempers of the imagination, which we most dread: And since it is so, assuredly we have it in our power, by following a like regimen, to live in the enjoyment of health and intellect.

The most complete lethargy I ever witnessed short of death, and curable by medicine, was that of one born with an uncommonly vigorous constitution: this person had kept the books and accounts of a Company, and travelled about their concerns, which implies a life of the greatest activity, a sound head, and hardy body; and by living thus in perpetual activity of mind and body for a course of years, and advancing towards his 40th year, he had wrought his system up gradually to the highest state of health, was extremely bulky, with a full face, a florid colour, a prominent eye, and a gross and full state of body; but in his severe journies, performed chiefly on horseback, he had suffered a violent inflammation about the perinaeum; a complete fistula was formed; and being much neglected, extended so as to penetrate to the intestine, opening at the same time by many orifices in the perinaeum, affecting in short every thing but the urethra. After

a few journies, he could no longer mount his horse, nor get into a carriage, and became loathsome to himself; and an ill judged delicacy preventing him from disclosing his situation, he lived for a long time quite secluded, abandoned his usual active exertions abroad, found his memory fail, so that he could do nothing at home, sunk into slothful and solitary habits, eat, drank, and slumbered night and day, till his senses were entirely gone. He was completely lethargic: whatever he was forced by importunity to speak, in the way of answer, was so inconsistent and inarticulate, that his friends feared he had lost his judgment as well as memory, and that his situation was desperate. When I was called, I found him lying in a great chair, in a deep sleep, from which he was very difficultly roused: it was after many successive visits, that I was able to extort a few such answers as shewed me that there was something more to be inquired into than this stupor; and it was only by examining without his leave, indeed almost without his consciousness, and directed by more than one of my senses into the state of the parts. So deep was his lethargy, that for many days I was obliged to trust merely to the report of his servants and friends, who were astonished at his inexplicable situation, till they found that I did not regard it as desperate: In a few weeks, by frequent and drastic purges, and blisters over the whole head, he was cured of the lethargy, and restored to his senses, and the necessary operation performed; and having left him, with the Prince's injunction to his companion Hall, "Learn to live cleanly," he has recovered the natural vigour of mind and body, that though he could not, for many weeks, speak one intelligible or consistent word, regulates once more the concerns of a company.

It cannot have escaped your observation, that at a certain period of life the human constitution undergoes a change, the full import of which you may not perhaps conceive, but which is at once accelerated by idle and luxurious habits, and rendered more critical in its consequences. You observe a man having a constitution capable of the most vigorous health, urged on by over-feeding and a luxurious and indolent life, into obesity and premature plethora and veinous dilatation: the cellular substance continues distending, the veinous system dilating, and he arrives at the age of 45, in uninterrupted and increasing health: But the arterial actions once repressed by veinous plethora, the body comes to be less perfectly nourished, the head to be loaded with blood, vertiginous complaints begin to be sensibly perceived, the stomach begins to be affected, and the spirits to fail; and to the affection of the stomach, is attributed the decrease of appetite, the consequent defect of nourishment, and the concomitant wasting of the body. Is it then to an affection of the

stomach, to idiopathic dyspepsia, to a mere defect of nourishment, that we are to ascribe this utter ruin of the system, this universal affection of all its functions? By no means; question your patient, and you will find, by all his lesser complaints and feelings, that an increasing congestion in the veinous system of the head has, by injuring the function of the brain, affected at once the appetite, the strength, the spirits, and the whole health; you will find that headaches, vertigo, languors, and dejection of spirits, hypochondriacal affections, incapacity for business, a necessity for air, exercise, and company, precede this wasting and emaciation of the system, a state of the system requiring in my opinion prescriptions very different from chamomile emetics, and doses of bark and port-wine. At the period of this revolution in the health, the vertigo, headaches, dyspepsia, and emaciation, keep an equal pace; no sooner is the health and fullness of the system wound up to this extreme point, no sooner does a man, inordinately lusty, fall off in flesh, than the utter ruin of his health and spirits ensues. This revolution must be ascribed to the gradual decline of some organ; and I leave you to judge to which cause you are to impute such changes, whether to the stomach, or to the brain? In the brain, as in the limbs, veinous dilatation is the invariable precursor of serous exudation, and veinous congestion and serous exudation are the causes of these phenomena.

I am persuaded that the numbers who die, having but a little passed the middle stage of life, of no formed complaint, but of gradually declining health, of debility, hypochondriacism, indigestion, languor, and wasting of the flesh, die from this indisposition of the brain; and that the lethargy, or apoplexy of old age, is the ultimate stage of this disease; and I think I can observe, that the predisposition which in men arise from an indolent luxurious life, arises in women from the peculiarities of their circulating system, from menstruation being necessarily connected with the general circulation, and the necessity of this habitual discharge: Menstruation gives the female system a natural tendency to plethora: early menstruation and frequent child-bearing, of women in warm climates, makes them early old; early marriages and frequent child-bearing, in women of our colder climate, disposes them to obesity; none are so loaded with fat, as those who have borne many children, for pregnancy and suckling are attended with such peculiar actions and such general excitement of the whole habit, as to produce a secretion of fat, and a veinous plethora. The menstrual flux, so essential to the fecundity of the uterine system, is a dangerous complication of the general circulation, and its tenden-

cy to produce disease cannot be understood without remarking its reaction upon the brain : even the occasional fullness which precedes menstruation, and the occasional highly irritable state of the system which attends it, influences the whole body. But the necessity of providing for so great an extension of substance as the womb suffers, in pregnancy, and for the nourishment and growth of the embryo, is a cause of great irregularities of circulation, and of oppressive accumulations of blood : hence the chief disorders of women, who are subject to headaches in youth, to stomach complaints, and ill health, while menstruation is yet irregular and not established, to hysterical and other fits, during the prime of life ; to obesity, women are most peculiarly predisposed, in the decline of life, and to lethargic stupor, and the slighter degrees of palsy, in old age. Often I have seen irregular menstruation produce habitual and dreadful headaches, those headaches attended at times with symptoms of temporary or slighter effusions of serum, and those effusions at last irremediable by any natural powers of the constitution, and fatal, causing, in the first instance, symptoms of insanity, and in the second symptoms of apoplectic torpor.

Nor should you wonder at finding me ascribing this lethargic or serous state of the brain, to various and apparently incongruous causes, to severe and protracted studies, to an intemperate as well as to an indolent life : I follow experience only, and state facts, such as it would be my duty to state, though I could in no degree explain them : Yet, if you reflect on the first change of structure, viz. veinous congestion gradually increasing, gradually oppressing the brain, and slowly lessening the absorption, you will not be at all surprised to find such a state as effectually produced by study, i. e. by continued intense excitement of the function of the brain, as by intemperance.

No abstract description of this disease can be so impressive as a case, or can so happily represent to your imagination, the slow progressive effects of physical disorder of the brain, in destroying the physical properties of the body, and along with these the faculties of the mind. The gentleman, whose case I am now to deliver to you, fell down stairs, and his immediate death was occasioned by an extravasation of blood, either consequent to the fall, or produced by the sudden bursting of some blood vessel : But his disease was the serous or lethargic state of the brain : the period of it was long, its process gradual : not a symptom, or no material one, is wanting in the following narrative of his case. He was afflicted with a slow train of paralytic and nervous affections : and was conscious, during many months, of the slow decline of his appetite and health, of his vigour of intellect and strength of body, of his vision, his powers of mastication, and of deglutition : he slumbered in his chair,

in his chariot, at table ; in all occupations and postures, and finally, his fall was occasioned by this stupor and paralytic weakness, hardly any function which the brain regulates remaining entire.

" This gentleman, a man of distinguished rank, was seized in spring with cramps, first in the calves of his legs, then in his thighs, and lastly in his hands and fingers. Towards midsummer his neck became painful, and his head was drawn to one side ; he caught a cold by drinking lemonade when over-heated, and, by a day of violent exercise, he greatly increased the catarrh. Various plasters and ointments were applied to the pained and rigid part of the neck ; but, while this was adoing, he began to observe a dimness of sight, with an appearance as of clouds floating before his eyes, and his palate became insensible, whatever he ate seeming tasteless : he used warm baths for several weeks, but without effect : he was then seized with a puking, which an emetic seemed to relieve, but in a few days the sickness returned, and what he vomited was sometimes frothy, sometimes bilious, often he simply vomited the meal he had taken.

" His appetite was now entirely gone ; his food seemed quite insipid ; and he felt as if, instead of a savoury morsel, he was chewing a bit of stick : the vomiting increased ; the obscurity of vision was deeper ; he often saw double ; often for days he could not write a letter ; in speaking, he was sensible at times of a degree of hesitation, and was conscious of particular difficulty in pronouncing the letter R ; thus slowly and gradually did these paralytic symptoms increase. He was now so very drowsy that he dropt asleep at table, and his sleep was heavy, oppressed, and snoring : he felt great lassitude and languor, walked very feebly, yawned long and wide, and when the fits of yawning came upon him, his speech was more interrupted, and he uttered the few words he was forced to speak with the greatest difficulty. This vomiting was often preceded by eructations ; the saliva flowed from his mouth ; the torpor and confusion of vision was particularly distressing, and for many months he continued to pass great quantities of pale urine. His pulse was throughout weak and frequent ; want of appetite, and continual sickness, brought on great emaciation, he was pale and weakly, suffered much from anxiety of mind, and yet was able to undertake great journies.

" About a month after he had begun to use the warm baths, Wepfer was called to him, and found him in the evening speaking with difficulty, as if his nostrils were plugged ; he complained of obscurity of vision, he saw double, and before supper he puked ; he ate little, slept most profoundly during the whole night, which was

that of the 11th of October 1681; and on the 12th, in spite of the earnest intreaties of Wepfer, he would set forth upon a day's journey, which he did accomplish before the evening, but arrived languid, fatigued, and fasting: four times during the forenoon of this day, and while upon his journey, he vomited, and had not advanced two miles when he began to slumber: he made his dinner of eggs, and a boiled quince, for he abhorred animal food, and all the afternoon he slept profoundly in the carriage; arriving late and wearied at his journey's end, he ate little, and slept profoundly the whole night long: In the morning he vomited much, and there seemed, before each fit of puking, to be strong heavings in the diaphragm, so that his face was inflated, and the tears ran over his cheeks, and after the stomach was emptied, he continued puking and reaching; yet he went abroad in his chariot, dined lightly on eggs and a boiled quince, and went after dinner to see the king pass in triumph.

"About four o'clock in the afternoon he fell down stairs, and was raised from the ground in a state of deadly stupor, his jaws alone clenched firmly, his limbs powerless and relaxed: Being laid in bed, a cordial was poured into his mouth, and he streight way became warm, complaining when he was revived of excessive heat. We believed (says Wepfer) his fall to have been the consequence of his confusion of head and weakness of limbs."

"I found (says Wepfer) his pulse quick and respiration regular; he complained, when raised up, of violent pain, nor could he suffer his back to be touched, the lap of his ear was torn in the fall by his ear-ring. Wepfer, now deliberating what to do, ordered only a sharp glyster, but refrained from bleeding, apprehending that there was actually a serous effusion within the head, the signs of which were torpor and somnolency, vertigo, and staggering, cloudy vision, and an impediment of speech, such as could not be attributed to the slight ulceration which was observed on the tongue, nor to a slight swelling of the tonsils which had now disappeared. The glyster was not returned for two hours; he began to move his head about; then sat up of his own accord, without help, and puked several times, but without vomiting: he had next several very fetid stools; and was plainly conscious of his filthy condition, which he expressed by uneasy and restless motions; but could not speak, although immediately before those loose stools, he had spoken a few words to Wepfer, expressive of uneasiness. All night he lay as usual, snoring in a profound sleep, extended like a log, without apparent feeling or sense: Wepfer ordered blisters to be applied to both legs and arms, and prescribed a cephalic water, but

nothing lightened the stupor; he never stirred a limb; he sometimes swallowed a little, but his jaws presently clenched again.

"In this condition he lay seven or eight days, when Wepfer, by the advice of Hamerer, ordered his shoulders to be scarified, and cupped with large cupping glasses: neither frictions, pinching, nor any other kind of excitement caused the slightest appearance of sensibility: He now lay in the deepest apoplexy: cephalic herbs steeped in wine were applied over his head, and live pidgeons cut in halves: Petit was now called, to whom they related all the circumstances of the case, who, notwithstanding the little remaining strength of the patient, ordered bleedings, vomits, and purges, to remove, if possible, the apoplexy, which he regarded as the chief cause, believing that the vital powers were only oppressed, not destroyed. He was bled till the pulse in the other arm began to fail. Of the purging potion he could take but a few spoonfuls, so slowly and imperfectly did he swallow. Next morning, before day, he was seized with a horrible epilepsy of the right side, while the left lay paralytic: long after each epileptic paroxysm, no pulse could be felt, and when it did return, the stertorous breathing began again. He was made to swallow a few spoonfuls of the cephalic water; and continued to have loose and fetid stools: the pulse and breathing varied: towards five in the morning, the pulse sunk, and death seemed to be approaching: his eyes, to the very moment of his death, were distorted and agitated by a perpetual convulsive motion. From five till nine he was tortured with pain, and with horrible paroxysms of epilepsy: the upper parts of his body were bedewed with sweat, his lower extremities were cold, his eye became flaccid as if a part of the aqueous humor had been discharged. The head was again drawn convulsively to one side: he now and then raised his arms: he died before twelve o'clock, the twentieth day from that of the fall."

DISSECTION.

"In the abdomen and thorax there was, as far as I could perceive, (says Wepfer) nothing remarkable. The fall had assuredly hurt only the thorax, for one rib was broken and projected inwards through the pleura, which was greatly inflamed; but on the head, though the ear-ring was ruffled by the fall, the scalp even was not bruised; there was certainly no mark of ecchymosis: the most prominent parts of the frontal and occipital bones were bumpy and almost gummatose; they were invested with pericranium of a natural colour, though rather inclined to whiteness: it

was difficult to raise the cranium from the dura mater, so firmly did it adhere; while the cranium itself, unusually brittle, crashed and crumbled with the slightest force, and the frontal sinuses were large and quite empty. On the left side, a foul serum issued from the low parts of the dura mater; it resembled the washings of flesh, and in part coagulated; and on laying open the dura mater, much grumous blood was found betwixt the meninges, among the convolutions of the brain, on the corpus callosum in the left ventricle, and in the third and fourth ventricles, and under the basis of the brain, and the left hemisphere appeared softer and more pulpy than the right, while the internal surface of the ventricle seemed rough, fleecy, and coated with a sort of mucus. Upon cutting out the brain, much yellow serum flowed from the canal of the spinal marrow; and in the cranium, in its basis, near the os petrosum, was something like a capillary fissure; the scull, from its dryness and brittleness, sounded like a broken jug, but there was no fracture, for a similar rent was seen on the other side *."

There must ever be something mysterious in cases of this nature: nothing can be more difficult than to decide whether, in the present instance, the extravasation happened in the moment of the fall, or whether it happened from the sudden giving way of some artery in the basis of the brain, betwixt the 8th and 9th day after the fall. If it happened in the moment of the fall, it cannot but seem wonderful, that a man whose brain was oppressed with so extensive an extravasation, should speak, complain, feel his pain when the injured part was touched, and even raised himself without help in bed; (yet that is in perfect consistency with various cases I have related:) If it happened on the night betwixt the eighth and ninth day from the fall, we cannot but wonder at extravasation taking place immediately after bleeding, a measure which, though quite from the purpose in a case of serous apoplexy, should have prevented any haemorrhagic effusion. I am, at any rate, contented to have thus curiously described to you the state of the whole system while the brain is drowned in this serous effusion, and the slow successive steps by which the functions are dissolved, death approaching. For this complaint, you will have remarked, began with the slightest nervous tremors, with cramps of the legs and thighs, a slight distortion of the neck, then dimness of sight, an appearance as if clouds were floating before the eyes;

* This seems to have been the Additumentum Suturae Lambdoida, in which they were in danger of marking down as a fracture, for the concluding words of his narrative are, "Anne forte sutura hiantior?"

double vision; loss of taste; loss of appetite, sickness; bilious vomiting; hesitation in speech; the words hardly audible, and uttered with difficulty; and there was added to the other phenomena, that decided sign of palsy and debility, the saliva dropping from his lips. These were all accompanied with such stupor, that he fell often down flat upon the table in deep oppression; there was continued lassitude, languor, feebleness of gait, perpetual drowsiness, snoring and long continued slumbers; at last, from increasing feebleness and stupor, his limbs tottered under him; he fell at last down stairs, and after lying insensible for ten days, he expired. All this is well depicted in the narrative, and with this vivid impression of the condition of one verging towards death, oppressed with the serous apoplexy, I take my leave of this subject proceeding next to describe the various consequences of the inflamed state of the brain.

SKETCH AND ILLUSTRATIONS OF THE INFLAMED STATE OF THE BRAIN.

It will, I am conscious, require thought and meditation to recollect or describe the many forms of inflammation of the brain. The inflammation of an organ of such wide influence in the system, and so essential to life, must be attended with various and terrible symptoms. The issue or termination as it is called, of inflammation in any given organ, (viz. by resolution, suppuration, or gangrene), must depend on the peculiarities of its structure, and on the laws of vascular action, but this however relates merely to changes of structure, suspected before, and visible only after death: but the symptoms of inflammation, the phaenomena produced in the general body, must depend upon the peculiar office of the affected organ, on its importance to life, on its influence over the whole system. In an organ, important and extensive in its influence as the brain is, the symptoms must be both violent and very anomalous: Pain, sickness, and constipation are the symptoms of inflamed abdomen; pain, cough, difficult breathing, bloody or viscid expectoration of the inflammation of the lungs; delirium, fever, sensibility to light and noise, and in the end, blindness, double vision, convulsions, howling, and the most unnatural and horrid screams, are the ordinary and inseparable symptoms of inflamed brain; but the various terminations in serous exudation, suppuration or gangrene, ulceration on the surface, or abscess within the substance of the brain, give a horrible variety to the symptoms.

Every step in physical knowledge facilitates every succeeding one: acquainted as you are with the general structure of the brain, and with many of its fatal affections,

you will readily conceive that there are many peculiarities in the structure of the brain, to give a singular and atrocious form to its very slightest diseases. First, the proportion of arteries and veins in the substance of the brain, of the action of the one, and of the resistance of the other, is so curiously adjusted, that the slightest loss of balance affects the function. The veins being dilated in the progress of life, and loaded with blood by some sudden impulse, all the effects of compressed brain instantly ensue: thus it is in the apoplectic stroke, when a sudden impulse from the arteries surcharges the veins, obscures the senses, checks the violence of the circulation, and makes the pulse and breathing slow, while the body is paralysed. But inflammation, whether extending over the surfaces or concentrated in the substance of the brain, is a high arterial action uncontrolled and unopposed by any accumulation in the veins, which takes its complexion from the degree and manner in which the brain is affected. Inflammation is the disease peculiar to child-hood or youth, to that stage of life in which a free and rapid transmission of the blood through the veins seconds the high action of the arteries; the senses, in place of being obscured by inflammation of the brain, become at first more acute, the eye more sensible to light, the ear to noise, and the whole frame to heat or any other exciting cause. The pulse is quick and fretful; the pain of the head intense and keen; and this dreadful headache tortures the patient till drowsiness, stupor, convulsions, double vision, blindness, and, at the last, total insensibility and death ensue, in consequence of serous exudation oppressing the brain.

But inflammation takes various forms as it affects the membranes, the surfaces, or the medullary substance of the brain, a part or the whole of it. You recollect the extent of surfaces of the brain, and the exquisite vascularity of the membrances, by which those surfaces are lined or involved! You are surely aware of the consequences: you surely have foreseen that this more than any other peculiarity must give the character to inflammation of the brain. Under high action of the arteries, exudation or serous effusion is inevitable; such effusion must happen; in any part in the brain it is fatal. A school-boy heated by running at a play, fighting and quarrelling, sweating first, and then exposed to cold, and sometimes lying basking in the sun, sometimes running hard, suffering also occasionally from falls and blows, has his brain inflamed as suddenly as the glottis and trachea are in Croup. He returns home after a day of violent exercise, feverish and languid; his pulse is quick and fretful, his cheek flushed, he complains of his temples, and hangs his head, throws himself across the bed, and presses his forehead or temples with his hands; then he cries and shrieks with the acute pain; he cannot endure the light,

nor the tread of a foot in his chamber, till in a few days the watery effusion going on from the first, shows its effects in the end; he begins to slumber, a sort of stupor, interrupted by dismal and piercing cries, follows the acute pains of the first day, the eye at first unable to endure the light is now insensible, the child squints, sees double, vomits, becomes entirely blind, and convulsive and automaton like motions ensue, consisting sometimes in a rotatory motion of the head, sometimes in a circumgiration of the hand; he gradually sinks into a deep stupor, and dies on the fourteenth or twentieth day with inflamed membranes, and a serous effusion into all the cavities, and over all the surfaces of the brain.

The import of these signs cannot be mistaken. But if such phenomena truly arise from the high vascular action extending over so great a surface, must they not be inseparable from every form of inflammation, almost from every form of disease in the brain? And they are inseparable! I never dissected a tumor, nor an abscess of the brain, from disease, or from external injury, where there was not serous effusion; never saw a boy die from fungous protrusion of the brain, in consequence of fracture of the scull, or rather of the injudicious use of the trepan, in whom I could not distinguish the signs of such effusion; the boy, expiring under fungus of the brain, shrieks during the inflamed stage, and is insensible or convulsed during the latter stage of serous effusion, and dies of water in the head. I cannot refrain from transcribing from my case book the abrupt notes of one dissection as an epitome of all the dissections of this kind I have there recorded.

The death of this boy, (who had been imprudently trepaned, a large portion of the cranium being ignorantly and wantonly removed, and the brain exposed unsupported except by the delicate dura mater,) was owing to a universal inflammation, and a partial protrusion of the brain. "When his parents first came to visit him in the hospital, he was sitting up in bed while his head was shaved; he held his pocket handkerchief in his hand, and wiped away carefully and nicely the blood that ran down his temples; he had never been discouraged, till upon seeing his mother, he laid down his head in her bosom and fell a crying and complaining of his head: thus entire were his senses and his faculties before the operation, which was immediately and most imprudently performed. He cried all the night succeeding the operation with pain in his head, but at eight in the morning of the second day I found him perfectly collected, nor was there the slightest degree of coma nor slowness, heaviness, nor interruption of the pulse: for five nights he was slightly feverish, restless, tossing, crying out with pain in his head; he was able to turn in bed, and to choose his side for lying upon,

never vomited, but had a total loathing of food and great thirst, drinking toast and water incessantly."

"On the fourth day, the first dressing was raised, when the taking off the salutary and necessary pressure on the brain made a sudden and terrible change; from the moment of raising this first dressing, he never held up his head, nor turned himself in bed, nor called for drink: his cries were now converted into shrieks: he had no convulsion, except a singular tremulous motion of the lip, which for one or two days returned frequently, and continued for ten minutes at each return: his eyes were usually but half closed, and turned up, or staring open: his cries made the wards and stair-cases ring, and returned every ten minutes, rising gradually from a complaining to the most piercing outcry, as if he had been surrounded by flames which first approached, and then scorched him. He without opening his eyes gropped forwards as if expecting to catch something with his hands; this was a frequent motion with him, accompanied usually with dismal howling: he was continually working with his right hand and leg, (the side on which the head was injured) as if with design of drawing up the bed cloaths, while the limbs on the opposite side lay still and motionless. The pulse was throughout quick, weak, and thready; the hands and feet were cold; the face deadly, pale, and only a little flushed on the centre of the cheek, while he was screaming with the agony. He died on the eleventh day. The last day his shrieks subsided into stifled groans and sighing, he grew all that day gradually weaker, and expired without a struggle."

"The state of the brain in this boy exactly resembled that of ————. The ventricles were full of serum, and very greatly enlarged. Wherever there is much arterial action, there must be much veinous congestion; and I found, accordingly, upon all the outer surface of the brain, and over all its convolutions, the visible arteries and veins extremely numerous, as if delicately painted or minutely injected. Upon cutting into the substance of the brain, there appeared innumerable points of a deep leaky colour, spewing out black blood, manifestly the sections of much dilated veinous branches. The veins on the inner surfaces of the ventricles appeared very big and straight, not tortuous as on the other surfaces, but running, (though dilated,) in straight lines: the ventricles greatly distended were full of a serous effusion tinged with yellow, like the serum of a blister, and their surfaces were in some places rough and spotted with a coagulable lymph. Beneath the fracture, in the substance of the right hemisphere of the brain, was a great abscess from which that matter was discharged which poured through the opening while the boy lived, and

all the surface of the brain was suppurating, and coated with a cream-coloured pus, such as membranes always secrete, such, for example, as you scrape from the surface of any strong fascia while in a state of ulceration: the inflammation which had reddened all the surface of the brain, and coated it with pus, had also caused an effusion of water every where, very yellow, like the thickest serum of a blister; much of this was found in the occipital hole, and down in the sheath of the spinal marrow. While the surfaces and particular parts were thus suppurated, the general substance of the brain was greatly hardened; it was so particularly firm, that when cut away, slice by slice, down to the basis, so as to leave but a thin plate of it, that plate flapped backwards and forwards with all the firmness of a muscle, in place of dissolving under the touch: Upon seeing such a condition of the brain, such dilatation both of the cavities and blood vessels, and such universal disorder, you form a lively conception of the confusion of intellect, the torturing and fiend-like state in which the creature must pass the days and nights which immediately precede dissolution."

By delivering the notes of this dissection, without altering the slightest word, I impress you, I doubt not, with the conviction which I have always felt, that not only is Hydrocephalus the most frequent disease, but such serous exudation the inseparable attendant of every inflammation of the brain: all those boys who are, either from fracture or accidental causes, afflicted with inflammation of the brain, after shrieking thus, die comatose, from dropsy of its cavities; nay, I am persuaded, that every slighter headache is an inflammation of the brain, as much as febrile diarrhoea is inflammation of the abdomen, or rheumatism inflammation of a joint. I am persuaded that I have often, in practice, seen headaches which could not be but attended with slighter degrees of effusion, but such as were absorbed again; and I shall prove to your conviction, unequivocally, that periodical and violent headaches are sometimes followed by the most extensive congestions of serum, and in short with fatal Hydrocephalus, in the adult as in the child.

There are certain peculiarities in the structure of the brain which establish this as the natural course and termination of inflammation: First, the surfaces are of great extent, and the membranes very highly vascular, hence the high action of the vessels is most naturally relieved by serous exudation: There is not in the brain that loose cellular substance which surrounds the muscular parts, and forms so great a proportion of other viscera: there is no space for those occasional serous and blood effusions in the interstices of its proper substance, which causes large and yet harmless suppuration of less important organs; whatever effusion does take place in the brain, injures its very

substance, and affects its offices, stops the course of the excited arterial action, and produces palsy: suppuration of the brain is thence comparatively rare.

Secondly, In the adult, with a fuller circulation, a ripened intellect, and the brain perfect in all its functions, inflammation affects more conspicuously the faculties of the mind, and hurries precipitately on to its terrible and fatal conclusion, and is fatal in a few days, before exudation can take place: First the pulse rises; the eyes are red, moist, and watery; the senses are in confusion; the skin is parched and hard; the headache intense and agonising; a furious and frantic delirium ensues; and, after two days of struggling and striking sometimes with maniacal strength and fury, the patient falls into a state of torpor; the eye deadens, the extremities become cold, the face haggard and wild, the features shrunk; the patient stares without seeing; picks the bed-clothes, and makes the motions of gathering motes in the air; passes his urine and faeces involuntarily; and, after a few hours of muttering delirium, expires. This is the Phrenitis of modern writers, the Sideratio of the ancients, the Sun-stroke or Coup de Soleil of warmer countries; this disease, more frequent on the continent, especially in Germany, Bavaria, in Italy, and the south of France, is known in this country, especially among the vulgar, by the name of Brain-fever; is often produced by long summers walks, hard riding, long exposure to the sun's rays, and especially it is caused among workmen and labourers by sleeping at mid-day in the sun: the brain, as I shall prove, though sometimes merely inflamed or slightly suppurated, is very often in such cases blackened and gangrenous.

Thirdly, The circulation within the brain is too impetuous to allow of slow and gradual suppuration, and that loose cellular substance is wanting, which allows of serous or mixed exudations leading to suppuration in parts otherwise constituted. General inflammation of the brain invariably terminates in serous exudation, in delirium, oppression, and stupor, or in actual gangrene: suppuration is rare, and when it occurs, it is usually a local disease; its progress also is slow, for the sensibility of the brain, like that of a bone or other seemingly insensible part, is very slowly roused. We have indeed every reason to conclude, that suppuration of the brain is owing to some local injury: often from a sudden slipping of the foot, a fall, a shock, a slight blow, an exertion in raising a heavy weight, some smaller vessels within the substance of the brain give way: sometimes the feeling is so distinct, that the patient is conscious of something having yielded within the head. I shall presently prove, by fact and demonstration, that local suppuration of the brain does ensue after such sensible yielding of some part within the brain, accompanied with the distinguishing mark of slight

palsy. Suppuration of the brain also arises from caries, from a slow scrophulous disease, especially from an affection of that part of the temporal bone in which the ear is formed. The ancients universally ascribed suppuration to corrupted blood, and of course attributed such suppurations not untruly to rupture of lesser arteries or veins, and all suppurations betwixt the scull and dura mater they ascribed to extravasation: They went farther, and supposed, that even while yet contained within the sinuses, where the circulation is slow and languid, blood might so stagnate and corrupt, as to cause abscess. Vomica Hypocrania, or abscess under the cranium, was the term by which they distinguished this suppuration; and their theory of that particular suppuration which is so frequent under the temporal bone, near the angle of the Lateral Sinus, was this, that it arose from the blood stagnating in that corner, where its motion was imagined to be slow, and its temperament apt to be corrupted.

Suppuration of the brain is always local; it begins in one point, ripens so slowly as to form for itself a firm and often a thick sac; the abscess is fairly circumscribed; constant pain marks the fixed seat of the disease, and occasional headaches, sometimes dreadful, and accompanied by a temporary delirium, mark the paroxysms of general inflammation: But though the destruction of the proper substance of the brain is gradually extending, according to the growth of the abscess, the faculties are nothing impaired, even while the pain rages: it is only when the inflammation extends to all the brain, when the exudation becomes general, when the ventricles are dilated, and the surfaces inundated with serum, that squinting, double vision, stupor, palsy, or convulsion appear: these are the forerunners of death; and the patient dies, not of the local abscess, but of the general disorder in the brain. A patient, whose proper disease is an abscess within the substance of the brain, dies (like the boy whose case I have just narrated) of hydrocephalus, distinguished by all its pathognomic signs.

You are thus prepared to meet, in every narrative of such diseases, with repeated proofs of one great pathological fact, viz. That those slighter effusions of blood or of serum, which in the less noble parts cause only an outward swelling, repress the high arterial action, and lead to resolution or suppuration, are, when they take place within the cavities, in the substance, or even on the surface of the brain, fatal to life. You will also remark this difference betwixt that superficial and diffused ulceration, which, in cases of deadened bone, takes possession of the surface,

and that circumscribed abscess, which is formed within the substance of the brain: The former runs through all its stages silently, to the moment of the last fatal shiverings, without delirium, high fever, or any thing, but cold chills, a flushed cheek, a loaded feeling in the head, and a febrile pulse; while the latter, the internal abscess, is attended in its progress with torturing headaches, amounting to delirium, repeated paroxysms of fever, and dreadful pain, till, after some violent attack of such inflammation, the fatal effusion takes place.

When we investigate, by dissection, the various conditions of the inflamed brain, we find reason, from the visible changes in its structure, to conclude, that, MANIA is an affection of its whole substance, by which it is indurated; HYDROCEPHALUS an inflammation of its extensive surfaces, whence a sudden effusion of serum takes place; VOMICA a local abscess usually arising from some effusion of serum or blood, slighter than that which produces the paralytic stroke; SIDERATIO, PHRENITIS, an inflammation more intense, hurrying on to its fatal conclusion before serous effusion can take place, where, after death, inflamed surfaces, and turgid vessels, are formed and one portion of the brain suppurated in part, and partly gangrenous or blackened.

This slight and sketchy outline of the various degrees and species of inflammation of the brain, I shall endeavour to fill up in its due proportions, so as to vindicate in some degree the title I have prefixed to this discourse, "Illustrations of the Inflamed State of the Brain:" I shall first report, in a general way, what we usually observe in practice, and then complete the more interesting part of my narrative by stating particular cases and facts. My first and most earnest wish is, that your conceptions may be clear and decisive, correct and rational, not fantastical, but founded on facts and dissections: My next wish and care shall be, to leave you with free unbiassed minds, to follow the dictates of experience and nature, doubting, investigating, and correcting my opinions as you improve in knowledge; a task in which I shall, on my own part, be sincerely and conscientiously engaged.

One most pernicious, absurd, and ignorant practice, I am sure you will learn to hold in abhorrence, I mean the indiscreet and promiscuous use of emetics, which are unfortunately given chiefly where they are most dangerous, viz. in affections of the head: An emetic is given to every adult, and to every infant, suspected of a foul stomach, a bilious habit, an approaching fever, or any unknown disorder of the head; emetics are given chiefly when the danger consists in a sudden impulse of the blood

towards the brain, where a shock such as the concussion of vomiting occasions must be irresistible, and will indeed be more likely to prove fatal than an actual blow.

In describing Hydrocephalus, Phrenitis or Vomica, I mean not to lay before you an entire system, but to give you the elements of knowledge, afterwards to be improved by practice; and without any intention of entering again on a subject already discussed. Yet I cannot refrain from protesting once more against the folly and danger of refusing pathological definitions of disease and resorting to logical distinctions which cannot but mislead, of refusing in truth to know what is the cause of disease. The error of arrangement which leads to any kind of error in practice, should not be a matter of indifference, and in relation to hydrocephalus a very universal and dangerous error has prevailed: Dropsy of the brain is arranged with other dropsies *; and by one of the most modern and best esteemed nosologists, is defined, "A soft inelastic swelling of the whole head, with gaping of the sutures.†" This is not hydrocephalus, but mere Mal-conformation of the head, not unfrequent in the new born child; while hydrocephalus is in truth the inflamed headache of children, terminating in serous effusion: it is a febrile and sudden disease caused by insolation, running, wrestling, and violent sports, favoured by family predisposition, and peculiar irritability of the vascular system of the brain; beginning with poignant headache, sensibility to light, and a febrile pulse, and ending in stupor, palsy, and slight convulsions. It is a disease peculiar to children betwixt three and ten years of age; and although the symptoms of hydrocephalus, were I now to relate them simply, would prove that it is purely inflammation, I know no surer way of impressing this truth upon your mind, than demonstrating the relation this particular disease has to the headaches and inflamed brain of those advanced to years of manhood; to the effects of fungous and suppuration from fractures of the scull; to the consequences sometimes arising from blows, even from blows of the fist, for though the impetuous circulation and powerful arterial system of the adult and full grown man usually hurries on the inflammation to gangrene and a sudden death, yet, in the adult, hydrocephalus is neither impossible nor indeed unfrequent.

* This is the error which Gaudelius, in his dissertation on hydrocephalus, plunges into the very first sentence, "Hydrocephali tamen, tam externi quam interni causae non aliae esse possunt proximae, quam quae hydropem generatim inferre in corporibus humanis consuerunt," page 344. Quite the reverse! With other dropsies this has not the slightest analogy; hydrocephalus in place of being, as represented by this arrangement, a mere passive exudation, is a disease of a nature purely inflammatory, an exudation of serum into the ventricles of the brain, preceded by excruciating pain.

† Capitis intumescentia mollis, inelastica, hiantibus cranii suturis."—*Cullen.*

Mark now the conclusion which I have formed from experience, the point to which these illustrations tend, that you may accompany me fairly in my reasoning, and assent to the conclusions I mean to deduce from them. "Headache is fatal, only when it ends in hydrocephalus: headache and hydrocephalus stand in the same relation to each other with inflammation and serous exudation in other parts." Physicians, as if they were careful to be ignorant, and only afraid of knowing the real cause, pronounce headache to be a "Nervous Disease," a term to which I have never, since I was able to read, think, or observe, been able to annex the shadow of a meaning, correct or incorrect. Yet this is the common language of practice; this nervous headache is supposed to rise from a disordered stomach, this disorder of stomach is to be removed by an emetic; an emetic brings up something, and that something appears to be either half digested food, (no unnatural consequence of vomiting) or mucous and gastric juice if there be no food; or bile squeezed into the stomach by the spasmodic and general pressure produced by the throes and painful efforts of vomiting: the headache is then declared to proceed from indigestion, from phlegm, or from bile, a reasoning quite level to the capacities of the vulgar, and to the patient most acceptable, since seeing the said food, bile, or mucous discharged, he must be at once satisfied of the wisdom of his physician, and consoled by seeing himself relieved of the immediate cause of his disease. We have no reason to wonder that in our difficult science that happens, which is so frequent in all physical inquiry, viz. That concomitants are mistaken for causes: from this mistake is the stomach thus purged of its natural food, natural mucus, and not less natural bile, but not without great and manifest danger from hurrying the blood more rapidly to the head. These doctrines and practices have prevailed from the days of Galen, who says, "Frequentissimo etiam videmus, flava in ventriculo bile contenta, caput dolore affici: illa vero ejecta per vomitum, illico dolorem compesci *."

Headache is an inflammation of the brain slight and transitory in the degree in which we usually witness it, but often fatal when it amounts to that savage pain denoted by the formidable words, Hemicrania, Megrim, Cephalagia, and Cephalea. By recollecting the succession of the symptoms, we shall be satisfied that the sickness is not a concomitant of the headache, an accidental coincidence, but a direct consequence of the disorder of the brain, and of the sickness, vomiting, and langour, which accompany congestion of blood or inflammation of the brain from an internal cause, as invariably as they do a fall or a blow.

* De locis affectis, lib. iii Cap. iv.

Headache begins in the morning with a sense of sickness and langour, after a long and oppressed sleep, the pain and heaviness continually increasing, with pulsation of the temples and forehead: the headache increasing, the face is pale and the pulse small and rapid,* the eyes become enflamed and watery, with universal restlessness, intolerance of light, heat, and noise, and such exquisite sensibility of the whole frame, that the tread of the foot even in an adjoining chamber, or the rattling of a carriage along the pavement, drives the patient to destraction. Then, in the second stage, comes vomiting with a corded feeling, as if the temples and forehead were squeezed in a vice; giddiness, sickness at stomach, and profuse evacuations of bile; on the second or third day, the paroxysm ends, and the patient continues passing well, till the disease is renewed often from some very slight and hardly preceptible cause.

Assuredly the stomach affects the head, since it is into the stomach we receive those peculiar stimuli which excite the general circulation, and hurry the arterial action in the brain; and in enumerating the causes of disorders in the head, this must surely be the first, for the stomach is suspected of affecting the head only when a man has partaken of a feast, or indulged in what he knows agrees ill with the system, has gorged with rich and high seasoned food, or exceeded in wine. This fullness and foulness of the stomach, though in itself it may, it must offend, is dangerous only from the ill effects of such excitement upon the circulating system of the head.

What are the chief causes of headache? Feasting, dancing, music, lights, wine, noise, mirth, and revelry; the heat of public rooms, late hours, severe and protracted studies, intense thinking, agitation of mind, passion, altercations, and wrangling; all pleasurable and all painful excitements whatever, in short, accelerates the circulation or quickens the pulsation of the arteries of the head, causes this temporary and slighter inflammation of the brain. Headache is inseparable from all febrile disorders, and is, in proper fever, usually the most oppressive symptom; it is the precur-

* Dolor Capitis, a plethora oriundus cognoscitur ex signis generalibus plethorae, stipatur pulsu raro; semper enim observavi in gravibus capitis doloribus pulsum rarescere, nec *semper facies est rubicunda.*"—Sauvages. Let it be recollected, that inflammations of all the cavities, especially of the abdomen, are marked by smallness of the pulse; in extreme headache, the suffering seems to subdue the actions of the system, as pain of any kind when extreme causes paleness and fainting. During the period of intense headache, the face is pale, the cheek hallow, the eyes languid, and the pulse extremely small; but the pulse rises, and the features swell upon bleeding.

sor and the sequela of apoplexy and of epilepsy; it is produced by charcoal fumes, drowning, suffocation, asthma, cough, hysterical paroxysms; it accompanies all excesses and irregularities of menstruation; it is produced by travelling, working, hard riding; and is frequent during the heats of autumn, from exposure to the meridian sun. But most of all are we to regard as an irresistable cause, that habitual propensity to inflammation of the brain, which is marked by frequent headaches: Headache is the peculiar disease of some families, as diarrhoea or slight abdominal inflammation is in some constitutions, cough or pulmonic inflammation in others, is the disease of the habit.

We are not to conclude that headache, because it is a frequent, a transient, and a harmless disease, is not an inflammation of the brain; for we might, with equal reason, deny Opthalmia or Cynache to be inflammation of the eye or throat, because they do not destroy the organ or ulcerate or suppurate! Opthalmia arises from heat or light, and from long exertions of the organ; from the heats of summer; from protracted studies or vigils, from the dust and wind and reflection of the sun; and it is allayed by quiet rest and coolness: Opthalmia does not always suppurate nor cause ulcers of the cornea to deprive us of vision, and yet is not less an inflammation of the eye; so is headache, though it does not always terminate in delirium, or in watery effusion, an inflammation of the brain: the most trivial headache is a degree of the same disease with the most violent, though it do not torture the patient into delirium, deprive him altogether of reason, nor end in effusion and palsy. The eyes are sometimes dazzled, sometimes irrecoverably inflamed by heat and light; the brain, in like manner, is sometimes slightly affected by excesses, sometimes deeply inflamed. How very closely the slightest headache is allied with the more persevering and desperate inflammation, how invariably this disease ends in serous effusion, the facts I have next to relate to you will prove. Even those headaches which seem little alarming, and in which, because of their frequent return, the patient is little pitied or cared for, I have often seen terminate in a degree of stupor, constipation, double vision, squinting, and other signs which to my apprehension intimate plainly that partial effusions do sometimes take place, and are reabsorbed. But habitual, persevering, and very violent headaches, increasing in years, confining the patient to bed during the paroxysm, attended with bilious vomitings and severe sickness, are as surely attended with effusion of serum as rheumatism is with swelling of the inflamed joint: we see such headaches depressing the spirits, hurting the memory; extenuating the body, and destroying the health; causing gray hairs and a broken constitution early in life.

Unwilling as we may be to represent this very trivial disorder, as a degree of the most dangerous disease, we must speak our opinion truly and plainly; we must not continue to deceive ourselves by describing headache by the unmeaning terms *Nervous*, intimating some confused belief, that the disease proceeds from exhausted strength, from debility, while the causes just enumerated prove its nature, and such deliberate reasoners and sound thinkers as Haller, Wepfer, and others, men well acquainted with the structure and morbid affections of each separate organ, pronounce this an inflammation of the brain. " Maxime dolores capitis visi sunt nasci, (says Haller), a cortice cerebri inflammato *.

The opinion of Haller is vindicated, in my poor judgment, by every fact in common practice; but the writings of Bonetus will best convince you, that inflammation of the substance or surfaces of the brain is inseparable from headache, and serous exudation from every high inflammation. His book, De Dolore Capitis, seems a simple and convincing illustration of this doctrine, that " headache is inflammation :" You are strongly persuaded of this while perusing his facts and narratives; it is only when you read his notes, enriched with many antiquated doctrines, relating, like those of Willis, to the ill qualities of extravasated serum, thickened nervous juices, obstructed tubes, and impeded actions of the fibres of the brain, that your doubts return. " A merchant, travelling at the principal fairs in Switzerland during the intense heats of summer, was seized with intolerable headaches, and was at last forced to stop in the Canton of Berne, and betake himself to bed : I bled him (says Bonetus) from the ancle, the arm, the veins behind his ears, and on the forehead, with leeches with cupping-glasses, in short in every possible way, and would not have spared the temporal arteries had there been a surgeon at hand fit to perform the operation. The patient however, without any change of symptoms, died on the fourth day. Upon raising the cranium, the veins of the brain and dura mater were found very turgid with blood, the scull seemed hardly to contain the brain, and the membranes seemed blackened, so full were they of blood : there was found in the anterior part of the brain, a small abscess, of the bulk of an almond, full of serum, bursting upon the slightest touch." This is a form of exudation very unusual, and strongly indicating the intense circulation in the brain : but from inflammation so long continued violent, we usually find, in place of such local effusion or watery abscess, a great exudation into the ventricles, or a general one on all the surfaces of the brain.

* Haller. El. Phisiolog. tom. iv. lib. 10. sect. 7.

" A. Taylor, 35 years of age, of a warm and bilious temperament, moderate in his way of life, but prone to passion, fell into a dreadful pain of the forehead, gravating, oppressive and lacerating ; but so limited was the seat of this pain, the upper part of the head was not at all affected : There was no fever, the pulse was slow, like that of a melancholic, he was otherwise in perfect health ; but from this pain came watching, delirium at times, and then again a sleep, or rather stupor so deep, that you might have torn him to pieces without his being roused, till he awakened naturally, and then there was no remission of the pain, which continued till the 14th on which day he expired without a struggle." Here also the blood vessels of the dura mater were turgid, the brain burst from the cranium as too narrow to contain it ; in the anterior ventricles were found eight ounces of serum, and the choroid plexus were bleached and colourless *.

Bonetus supposes that, in such a case as this, after each paroxysm of anger, proportioned effusions of serum take place, and successive additions to what is effused ; but every future variety of the disease will prove to you that exudation is the immediate and instant consequence of inflammation, that such exudation takes place in a few days, I had almost said in a few hours illness : dissections such as this, must always be interesting, but hardly is there one more so than that of a young man, a student, who having for a fortnight been afflicted with incessant intense headache, fell into a fever, attended with watchfulness, convulsive motions, and delirium, and died, notwithstanding blisters and repeated bleedings. †" The head being opened, the

* Mortuo aperio caput, ecce vasa turgent in Meningi bus cranium nimiam cerebri molem non poterat capere. Interiora rimando, occurrunt in ventriculis anterioribus unciae viii seri flavi et plexus choroides sub albicanus.

† Nec minus à phlegmone, et abscessu, quam ab hujusmodi meningum nodis, et tuberculis nonnunquam cephalalgiae lethales, aut incurabiles oriuntur. Olim juvenis Academicus cum per duas septimanas de gravsssimo capitis dolore ipsum incessanter affligente conquestus, erat tandem febre aucta, mox vigiliae, motus convulsivi, ac confabulatio delira succedebant ; quo tempore medicus accersitus, phlebotomia enematis, emplastris, revulsivis, vesicatoriis, item remediis internis, quae fluxionem sanguinis, ac humorem à capite devocent, sedulo adhibitia, nihil proficere potuit, quin mors brevi successerit. Calvaria aperta, vasa meningas obducentia erant sanguine repleta, et plurimum distenta, quasi cruoris massa illuc tota confluxerat, ita ut sinubus dissectis, et apertis, cruor affatim erumpens, ad plures uncias, supra lib. ii. pondus effluxerit : porro ipsae membranae tumore phlegmonoide per totum affectae, discolores apparebant : integumentis hisce sublatis, cerebri anfractus omnes, ejusque ventriculi, aqua limpida erant pleni, ejusque substantia, utpore nimis irrigata, madida erat, et minus

the vessels even on the membranes of the brain seemed crammed, as if the whole blood of the body had flowed towards the brain, insomuch that, the sinuses being opened, blood burst out, and nearly a pound flowed from them; the membranes moreover were universally inflamed and discoloured, and when they were raised up, the convolutions of the brain were seen inundated with water: the ventricles were full of limpid water, while its very substance, as if infiltrated with serum, was moist and soft."

" A noble lady, who had for many years suffered under a variety of disorders, and been occasionally afflicted with spasmodic affections, complained of great heaviness and pain of the head; she was suddenly struck, at midnight, while buried in sleep, with convulsions followed by fatal apoplexy. Upon dissecting the head, and removing the skull-cap, the vessels of the dura mater and brain were seen distended with blood, while, in cutting into the other cavities and parts of the body, hardly any blood flowed: upon removing the dura mater, there was seen, under the more delicate pia mater, in every fold of the membrane, round every convolution of the brain, a profusion of limpid serum, while the same serous effusion filled all cavities and recesses of the brain: the choroid plexus seemed white, bleached like, and almost corrupted.*" A consultation of Balonius puts this effect of vascular action in the clearest point of view, demonstrates how inseparable febrile delirium, or coma, and watery effusion into the ventricles of the brain, are from one another, explains what I have said of the connection of delirium and fever, and shows the analogy betwixt the headaches of the adult and the hydrocephalus in the child. " A young man, being struck with violent headache about the middle of the month

firma. Procul dubio in hoc casu sanguinis *effervescentis in meningas incursus*, ejusque ibidem aggestio, phlegmonem *excitans, cephalalgiae, et subsequentis delirii causa fuit.*——*Willis, p.* 156.

* " Domina Perillustris per multos annos affectibus spasmodicis obnoxia, variosque et diversos perpessa, de capitis dolore et gravitate insigni conquesta, cum circa initium noctis alte dormiverat, expergefacta in paroxysmum convulsivum incidit, qui statim in Apoplexiam lethalem transiit.

" Ejus calvaria exempta, vasas meningas et cerebrum perreptantia sanguine plena et distenta apparebant, cum in reliquo corpore inter dissecandum vix quicquam sanguinis effluxerat: Meninge crassiore amota, pet alteram tenuem et pellucidam, aqua limpida cerebri plicas et anfractus implens, ejusque totam compagem quasi inundans cernebatur; revera omnes cerebri cavitates et recessus colluvies serosa impleverat: Plexus choroeides aquae diu immersus, et velut elixus discolor et semicorruptus evaserat. *Willis, Pathol. Cerebri. cap.* x.

of October, died on the 40th day: along with his headache there was an obscure fever, but such as he himself was not conscious of: while he went about as usual, and lived a careless and irregular life, the fever increased, and with the fever the headache, till, careless as he was, and fearless of consequences, he was entirely confined to bed. Neither the pulse nor the urine corresponded with the headache nor fever: the viscera were in some degree, but the head conspicuously, inflamed, the eye glaring, the face, and especially the cheeks, reddened; the headache was seated chiefly in the occiput; the bowels were costive, so that not the slightest motion was procured but by medicine; every symptom was aggravated during the night, which was spent in great confusion, clamour, agitation, occasional delirium, and unbecoming postures of the limbs and body; then intervals of reason occurred with returning delirium, and at last sleep, so profound and deep that he could hardly be roused from it, coma vigil, and all kinds of irregular symptoms: sometimes he lay lethargic, sometimes raved, till at last the eyes became fixed and staring, as in universal convulsion, the low and mild delirium succeeded, the right side was stiffened with spasms, followed by a paralytic state; while, from the symptoms growing milder, and the occasional success of our remedies, we began to indulge better hopes, but the disease increased, the pains returned, and he expired on the 40th day.

" Upon opening the head, the veins seemed varicose, distended with black and putrid blood; much water was found in the middle ventricle; the medullary substance of the brain, soft and friable by nature, seemed dry, and its membranes still drier, so that they were actually rigid, could not be torn as usual, nor were they even easily cut, but withstood the edge of the knife*." This fever plainly had arisen from the inflammation of the brain,

* " Aperto capite venae quasi varicosae, tabo et sanguine nigro turgentes videntur: Item observatum in ventriculo medio serum multum: medulla cerebri, quae mollior et friabilis esse debet, siccior: membranae siccissimae, quasi per siriasin et deflagrationem arefactae et rigentes, vix lacerabantur, vix novacula praecidebantur, acutiei secantis resistentes: imo sectae crepabant more membranarum arietinarum atque occalescentiam: pulmonis partes dextrae lateri adhaesu contumaciore, lacerabiles nectebantur plenae vomicis tabo et pure scatentibus: haec reliqua ex gravi peripneumonia, quae anno praeterito illum oppressit ac pene consumpsit: Hepar labem conceperat, sed non maximam qualem pulmo. *Ballonius, lib.* 3. *cons.* 71.

This singular and instructive case and dissection is taken from Ballonius, an author who is confoundedly learned, and not less ingenious than learned; for I find him prescribing for an impotent

which was the idiopathic disease, the fever both Bonet and Balonius designate by the term "Febris vere Cephalice Typhoides." The accession of fever after pain, the alternations of delirium and coma, the close of this delirious stage in low muttering, make the narrative highly interesting: The brain was hardened by the long continued action of its vessels, as it always is in mania, which is a slower, less unnatural, less disorganizing action than that of headache: the serum effused, shews how invariably this phenomenon takes place in inflammation, and completes the parallel, I proposed to establish, betwixt the headache of adults, and the hydrocephalus of younger subjects, whose vascular brain is more succulent, more delicate, more disposed to exudation.

If headache or simple inflammation be thus followed by serous effusion, much more must that degree which ends in ulceration either on the surfaces or in the cavities of the brain. The following dissection by Ilmer, where, in consequence of inflammation and slight ulceration of the brain, there was a great effusion of serum, corresponds with that of the boy just quoted, and with all the dissections I have ever performed or witnessed. "A nobleman, 46 years of age, fell ill, four days before the summer solstice, of a heavy, tense, and lacerating pain, affecting all the upper and fore parts of the head, followed by continual watchfulness: eight days passed in this distress, with occasional delirium, but always the delirium was mild, gentle, and never furious; the day preceding his death, his whole body was agitated with slight convulsions. We could not, during the whole of this period, perceive the slightest sign of heat or fever, slight nor violent, idiopathic nor symptomatic, except on the day preceding his death, when the convulsive motions seemed to create a degree of fever in the pulse, which for ten days beat slow and languid like that of a melancholic person."

"To discover the cause of such unremiting headaches, I opened the cranium, and found, first, the veins and arteries of the dura and pia mater full of black blood, and those of the brain itself distended in the manner I have usually observed in those who have died convulsed or passionate: secondly, under the middle of the right parietal bone, extending from the falx to the temporal suture, I found an oblong ulcer, with thick and yellow matter: thirdly, in the cavities or ventricles of the

young man, that he should be well fed with the BRAINS of SPARROWS! Surely if that did not put notions in his head, nothing could.

brain, I found twelve ounces of limpid serum: fourthly, the right choroid plexus was somewhat ulcerated and corrupted," &c.*

Serous exudation takes place from the inflamed surfaces, in a degree proportioned to that of the vascular action; sometimes in four days, sometimes in fourteen, (the usual period in hydrocephalus,) sometimes in thirty or forty days, as in the case of febrile headache just narrated: sometimes habitual and chronic headaches, severe and oppressive while they last, but returning at great and distant intervals of time, are followed by effusion of serum in quantities almost incredible.

" A noble lady, (says Mr Bailly), who had, during her early years, been subject to haemorrhoidal discharges, had, from her eighteenth year, been afflicted with hemicrania affecting all the anterior and left part of the head, and returning with violence once a week. By the use of smart purges, the paroxysms were sometimes warded off for fifteen or twenty days. When the pain ceased, the eye of the affected side poured out a profusion of tears, a sure and acceptable sign to her that her disorder was about to cease. After her death there was found in all the cavities or ventricles, anterior as well as posterior, and in all the doublings of the falx and dura mater, a saltish and yellow coloured serum to the amount of a pint, or nearly five pounds apothecaries measure."

We have been gradually approaching to the legitimate and direct evidence of that fact, which needs only to be clearly proved to become extremely interesting, viz. That the severe headache of the adult is but a slower hydrocephalus; and the converse, that hydrocephalus is that effusion of serum, and consequent stupor, which invariably follows inflammation of the brain. " Jacobus Reutinger, (says Bonetus), was a man of

* " Ut igitur cognosceretur causa tam pertinacis doloris, mortuo aperio caput, et ecce reperio, 1. venas arteriasque durae et piae meningis turgentes plenasque nigro sanguine, ac ita particularem vasorum capitis repletionem, uti saepius in convulsis et iratis observavi. 2. Sub medio ossis sincipitis dextri, a processu falcato usque ad os temporis, extensum video ulcus oblongum cum sanie crassa et multum flava, quod ego habui pro maligno, quia ante aliquot annos a pharmacopaeo sciolo, in curatione gonorrhaeae exhibita fuerant mercurialia, forte non bene praeparata: 3. Interiora cerebri rimando, ventriculis anterioribus uncias xii. seri limpidissimi occurrebant: 4. Plexus choroideus nonnihil erat arrosus et putrefactus; inquisivi quoque in vasa lymphatica cerebri, sed ut ea viderem tam lynceus non fui: 5. In pectore aperto, pulmones dextri lateris duplo erant majores solito, unde forsan causa quod aeger semper in dextrum latus, etiam invitus decubuerit; sinistri verò, a sterno usque ad spinam dorsi, ita pleurae et costis accreverunt, ut judicarem eos mille clavis affixos, sanie, pure et scirrhis; cor autem optime constitutum." *Ex Observat. D. Frederici Ferdinandi Illmeri Medici in Wartemberg. in Miscell. curiosis anni* 1670.

about fifty years of age, of a hot adust temperament, of a tawney complexion, a fleshy form, with crisp black hair, thin and bald on one side of his head from his boyish years, extremely irascible in his temper: he lived by the hardest labour, being employed chiefly about vineyards: he was much addicted to drinking, and rarely scrupled, when thirsty from labour, to cool and moisten his parched viscera with wine: The colour of his pimply face plainly told the tale, (et non raro sicca labore, pectora fervido maduisse mero visum fuisse gutta rosacea, quae faciem foedabat, fidem fecit): It were trivial to inquire, (says Bonetus), impossible indeed to learn, the diseases to which such a person had been subject during a life so irregular, but this I knew, (for he had applied for my advice), that he had for some months been tortured with a cruel heart-burn, which had been cured by purges and stomachic bitters, but which returned from misery, hunger, and the necessity of eating the vilest food. Ill satisfied with my poor advice, he consulted the hangman, whose cures consisted of prayers, or, as I fear, of incantations, which the vulgar regard as their last refuge, and never scruple at the most shocking impieties. For some weeks before his death, this man endured excruciating pains shooting through the head, unremitting, seated chiefly in the forehead and occiput: wearied of medicines, he used only some old woman's plasters outwardly; at times he was desperate and frantic with the pain, unconscious what he said or did. For three weeks before his death, he was entirely blind of a proper gutta serena, without the slightest apparent defect in the eye,"

" At this time, the excruciating pain ceased, but there remained such extreme anxiety, that he tossed from side to side in his bed, nor was he in a condition to acoount for this anxiety and restlessness: fourteen days before his death, he began to wet the bed; and in a few days, there succeeded to this paralysis of the bladder a palsy first of the right side, and then of the left. During the four days preceding his death, he lay buried in a profound apoplexy, void of sense or motion; nothing we could do excited the least sign of feeling; he perspired profusely, and snored continually: during all his illness he was free from fever."

" On the day after his death, I dissected the head, (says Bonetus): upon opening the dura mater, a pale and yellowish serum flowed out with a jet like that of blood flowing from the median vein in bleeding, and in such profusion, that you might have filled from the stream several ounce measures. This serum was collected chiefly in the space betwixt the dura and pia mater; a space which, in this subject, seemed greatly enlarged by the serum, at once dilating the dura

mater wherever that was possible, and compressing the cerebellum and brain. There was an equal quantity of serum collected betwixt the pia mater, and around the convalutions of the brain and cerebellum, so that each convolution and sulcus seemed surrounded by gelatinous globes, but these, when divided by the knife, poured out the same kind of limpid serum with that which occupied the space betwixt the membranes. Nay, the very substance of the brain and cerebellum seemed soaked and infiltrated with serum, both being soft, flaccid, and like a poultice, so that the slightest touch broke down their structure. In all the ventricles was found the same serum: upon pressing the cerebellum, much serum regurgitated into the third ventricle: the choroid plexuses were livid, bloodless, and studded with many hardish varicose-like tumors; and upon dividing the medulla oblongata, taking out the cerebellum and brain, and inclining the head, much serum ran from the occipital hole, so that I doubt not the whole spinal canal was full of water. Such a disease (says Bonetus) I feel no difficulty in pronouncing to be a species of hydrocephalus, a dropsy of the brain."

I will not leave you on this occasion entirely to your own reflections, but will suggest my own: Here you have external signs so curiously connected with the actual state of the organ, that having once resolved this case into its principles, every similar case will be quite intelligible. You will naturally remark that these phenomena must be ranked under one of two designations, either common HEADACHE terminating in hydrocephalus, or HYDROCEPHALUS occurring in an adult of fifty years of age. In this person an unhappy and irascible temper, conjoined with an irregular life, working severely in the vineyards in the hottest season of the year, frequent intoxication, together with poor and scanty food operating on a habit coarse, strong, and predisposed to inflammation, brought on severe headaches. But headache is a trivial disease; we are indifferent to its approach; we fear no fatal consequences; it seldom enters into our imagination that the patient may die; the sensible and judicious prognostic of Willis, where he says, "Headache, whether continued or remitting, if it be excessive, accompanied with vomiting, vertigo, convulsive disorders, or stupor, is never void of danger, but often ends in apoplexy, epilepsy, palsy, deafness, or blindness, and other fatal or at least incurable diseases,"† is quite

* *Dolore capitis* sive *continuus*, sive *periodicus*, si immanis fuerit, atque vertiginem, vomitionem, aliosque affectus aut convulsivos, aut soporosos adjunctos habuerit, periculi magni suspicionem praebet: utpote qui saepe in *Apoplexiam* lethalem et non raro in *Epilepsiam*, *Paralysim*, *caecitatem*, *surditatem*, aliosque morbos aut *funestos* aut *incurabiles* transit.

forgotten, and when the headache ends in delirium, delirium in stupor, and stupor in palsy, and the patient, contrary to all expectation, dies, we can hardly believe that such complicated distress has proceeded to its fatal period without being produced by tumor or abscess, extravasation of blood, or some conspicuous and proportioned disorder of the brain; we cannot prevail with ourselves to believe that the patient dies so horrible a death in consequence of mere inflammation with consequent effusion of serum.

This being a true and faithful picture of the usual indifference to this terrible malady, the case now before us must be extremely interesting. We affect not to explain its phenomena by any curious description of the courses direct or retrograde, rapid or obstructed, of the nervous fluid or animal spirits, nor by showing how these encounter, oppose, and obstruct each others course, or prevent the mutual egress or ingress of spirits and nervous fluid, but proceed to trace and ascertain a plain correspondence betwixt certain states of the sensorium and the condition of the organ. In this poor creature's case, we have first, corresponding in point of time with the period of inflammation, excruciating unremitting pain, delirium and fury, the patient desperate and frantic with suffering, and unconscious of his extravagance in words and actions. Secondly, corresponding with the period of serous effusion, we have, for three weeks preceding his death, total blindness from gutta serena, with tossing, restlessness, and stupor. Thirdly, we remark a period during which all the powers of mind and body are successively and gradually abolished; this period extends to fourteen days; the urine first passes without consciousness, the right leg first, and then the left becomes paralytic, the stupor increases, and a death-like stillness prevails, from which he can be roused by no excitement; he expires snoring and apoplectic; and there is found after death, no kind of disorder, but watery effusion! water on the surface, water in the ventricles, water within the substance, as well as round the convolutions of the cerebellum and brain.

Study this subject with that industry which it well deserves; look through the collected cases of Bonetus, Leiutaud, Morgagni, and Wepfer, and you will find a new and interesting scene open upon you: you will find headache not a mere symptom, an irregular affection, a nervous disorder, but a definite and most serious disease: you will find every proof you could desire of its arising from an inflamed state of the brain: you will not have one slight or lingering doubt of the essential unity of headache and hydrocephalus, or in other terms of inflammation and serous effusion,

nor the slightest doubt of the serous effusion being a mere symptom: you will find every proof you could desire in the very titles of the several histories, accompanied however with this strange perversion of the sense of each case, viz. that the serous effusion is stated as the cause. The several varieties of the disorder are thus distinguished: "A cephalagia from effusion of serum," "Hemicrania from a vast effusion of serum betwixt the dura and pia mater," or, "Cephalea from water confined within the ventricles of the brain." ("Cephalea a sero cohibito in Cerebri Ventriculis,") or, "Cephalagia from a profusion of water within the head, the transudation of it through the ears being interrupted.*" Thus is the disorder imputed in the title and in the scholia upon each case to the acrimony, to the quantity, or to the confinement of the serum; and every thing perverted except the immutable facts, of pain implying inflammation, inflammation being accompanied with effusion, and effusion causing stupor: So far have pathologists mistaken the nature of the existing disease, as to wonder how such cruel symptoms could be produced by so small a quantity of water. "Exiguam adeo aquae quantitatem (cochlearia tria,) dolorem intulisse mirum videre polerit; sed salsam illam, fuisse, acrem, muriaticam, vel acidam ostendunt subsequutae convulsiones †."

Regarded as a *cause*, three spoonfuls of water must seem greatly inadequate to produce any ill effect, and that it should excite convulsions, is a circumstance which even its saline and acidulous tendency cannot entirely explain; but as a *consequence*, it is sufficient to imply that intensity of inflammation which proves fatal. Were you to be at more pains, than ever I have been, to analyse cases of headache, attended with long-suffering and death, were you to mark down all its possible causes, Fungus, Inflamed Membranes, Tumors, Schirrus, abscess of the substance of the brain, diseases of the pineal gland! taking all organic disorders in cumulo, you would not find half the number of fatal headaches produced by all the others that you would find proceeding from simple inflammation accompanied with a limpid and purely serous effusion.

There is, you perceive, much subject of observation on the margin of a book, as there is often much of opinion and doctrine expressed in a simple term. Hydrocephalus is the headache of children ending in serous effusion; hence authors have not been always aware when they were describing hydrocephalus, but have imagined themselves describing a natural headache proceeding from cold, from fever, from an emetic im-

* "Cephalagia ab aquae copia in capite, ob evaporationem per aures susceptas."

† Bonetus, page 15.

prudently given, from a fall or a blow! But, whatever the first cause, the disease is inflammation, the final disorder serous effusion. The disease is sometimes designated "Death from a cold abscess," "Death from a serous abscess in the brain," "Headache in a boy from effusion of serum;" sometimes "Lethargy from serum, to the quantity of a pound, occuping the right ventricle of the brain;" sometimes, "Lethargic sleep from serum stagnating about the Medulla Oblongata and Basis Cerebri." Sometimes it is described as "A pungent pain of the head from limpid serum collected in the posterior ventricles of the brain." One thing is especially worthy of remark, that even in those cases where authors particularly declare, that there was no inflammation, that the disease was wholly caused by serum, we have every proof we could desire, that the exudation had been a mere consequence of the inflamed state of the surfaces, preceded by every sign of inflammation, as in the following narrative, taken from Coiter, and intitled, "*Phrenitis, with an uninflamed brain, caused by a serous effusion in various parts of the cerebrum.*"

"In August of the year 1567, a woman, after deep affliction, was seized with pain in the head and burning fever, followed by phrenzy, so that she was supposed by the vulgar to be struck with the plague; every symptom attested the cause of this phrenzy to be an ebulition of the blood: she laughed, joked, sung, and in every way, and by all her manner and gestures, testified great hilarity; still she answered questions, though sometimes she refused, and often she raised her hand to her head as if intimating that there lay her pain: she was early bled and purged; the blood was crude and serous; she recovered her intellect for a little, and then expired."

"Upon opening the head, a serum like the washings of flesh first flowed out. The vessels of the pia mater and of the choroid plexus were turgid with a thin watery blood; both ventricles were found equally full of water: not a speck of inflammation was to be seen in the membranes nor in the substance of the brain. From the sinuses of the dura mater, I drew out, as from those of the hanged and suffocated, long stringy coagula consisting of pale mucous like worms.*"

* Anno 1567, mense Augusto, Mulier ex ingenti animi moerore, febri ardenti cum capitis dolore, cui postea Phrenesis supervenit, correpta, vulgus duxit Hungaricum illum morbum fuisse: Signa omnia attestabantur hanc Phr. ex sanguine, fuisse, ridebat, jocabatur cantabat, omnibusque gestibusque hilaritatem exhibebat: interim ad interrogata responsum dedit, aliquando non; frequenter manum capiti, tanquam istic dolorem persentisceret, admovebat: Tempestivè fuit levibus medicamentis purgata et venae secta; sanguis erat majori ex parte pituitosus, crudus et serosus: tandem resipuit et paulò post obiit. Aperui caput: dum serra cranium removebam, effluxit aqua loturae carnium similis: Tenuis

I would instruct you to register blows, falls, insolation, hard running at games, fever, and such irregularities and accidents as school boys are subject to, among the most frequent causes of water in the head, which begins usually like a headache, sometimes like a cold, sometimes like fever, and very often among school-boys follows a boxing match or a blow, of which I think it right to lay before you at least one example.

" Example of *Lethargy*, (so it is entitled in the original,) from serum to the amount of a pound occupying the right ventricle of the brain."—" A boy of fourteen years of age, about two months before his death, fell from a height, hurt his head, and was rolled home by his school-fellows in a wheel-barrow; he fell into a fever; a quack was first of all consulted, and at last I was called. I found the boy a little feverish, stupid, drunk-like, and reeling, without thirst, but complaining of his head, which was yet neither red nor inflamed: soon after this he was struck mute with closed eye-lids and a grinding of the teeth: glysters, cupping, and the usual remedies were practised in vain, and though he occasionally spoke or muttered, he presently became dumb again, and soon expired." " Upon opening the body (says Coiter) I found an adhesion of the lungs and liver to each other on the right side. The right ventricle of the brain contained a pound of serum, to which solely is the Lethargy to be ascribed." Since a blow upon the head can thus excite inflammation followed by effusion, we can find no difference (the delicacy and importance of the organ excepted) betwixt an inflammation and effusion of serum in the brain, and inflammation and effusion of serum into the coats of the testicle from a blow, the most ordinary cause of hydrocele.

" A lively and pleasant boy about eleven years of age, of a good habit of body, was seized, after eating fruit greedily, with excessive vomiting and tormina, immediately followed with headache and fever; and his parents fearing an abscess of the brain, which had already carried off several of their children with a discharge of matter from the ear, called a Parisian physician, the usual attendant of the family, by whom various medicines, external and internal, were prescribed. But the boy was on the ninth day of the disease seized with stupor and expired."

membranae et plexus choroidis vasa aquoso et pituitoso sanguine turgebant: uterque ventriculus, tam dexter quàm sinister, plenus aqua fuit inventus: Nullam nec in membranis, nec in cerebri substantia deprehendere quivi inflammationem: Ex sinibus durae membranae cerebri, ut alia sex suspendio enecatorum cerebris, extraxi fibras, seu filamenta crassa, lumbricis non dissimilia, ex alba pituia conflata; Similes sumpsi ex cordis ventriculis.—*Volch. Coiter. lib. Observat. Anatom.*

" Peierius dissected the body in the presence of Du Verney. Upon raising the scull-cap, no vestige of abscess was found in the brain, nor was there any thing of that disorder which Willis in his Pathology describes as frequent in the brain of the lethargic. All appeared sound, except at the basis of the brain, and especially about the medulla oblongata and spinalis, where there was an effusion of yellowish stagnant serum, with which we filled three table spoons."

I do not think I could easily select for you a purer case of inflammation of the brain, (a disease to which all the children of this family seem to have been liable, and of which many of them had died,) a case where the persuasion was so absolute of there being an abscess in the substance of the brain, or a search more accurate or anxious, for whatever might be wrong, or by anatomists better qualified for the task: the inflammation was simple, effusion was the sole consequence: we see here how from mere inflammation unaccompanied either with abscess or gangrene, the patient may be cut off: the disease came all within the natural period of hydrocephalus, and was accompanied with its principal symptoms.

We have reason to believe that this boy's disease arose in part from fever, but have no doubt that excessive vomiting, artificial or natural, is often a principal cause. Whatever excites inflammation of the Schneiderian membrane, the lungs, the teeth, &c. is apt to excite inflammation of the brain: we cannot doubt that taking cold is a frequent cause of this disease: we see school-boys who are suddenly cooled after being heated with running, affected with inflammation of the brain; but we are never so sure of the circumstances which immediately produce the disorder as when all the little ones of a family are variously affected by one cause. " The little children of Michael Tremuleus were intrusted to the care of a senseless servant girl, who, in the dusk of the evening, draggled them through the streets and suburbs of the city; they were heated because they had not yet left off their winter habits, and with open and perspiring pores, they were made to puddle through streets floated with rain, and in the chill of the evening. One of the little sisters was seized next morning with toothache and pain of the jaws, another with cough, a third with continued fever, with frequent exacerbations, especially in the evening. This fever was accompanied with a lethargic stupor, a singular flushing of the cheeks, approaching during the paroxysms to absolute livor, and vomiting in the commencement of the disease: there was cough also, but neither painful nor frequent, nor was the breathing much oppressed: the eyes were insensible and the eye-lids close: at intervals, the eye-lids were raised, but there was no winking when the hand was pas-

sed before the eyes; the eye-lids were livid: and it was plain that the child was blind, and death fast approaching. The child died on the 12th day; and for twelve hours before it expired, the defluxion seemed to have fallen down upon the breast, and the swallowing was interrupted."

"The body being opened next day; after discovering an abscess and incipient gangrene (marked by livor and blackness in the lungs,) the head was opened to discover the cause of the lethargy and stupor. The brain was found more turgid, and higher than usual, so that not the smallest space was left betwixt the brain, and dura mater; and upon raising the dura mater, drawing out the falx, and observing the sinus, and separating the right from the left hemisphere of the brain there presented itself betwixt the cortical substance and the corpus callosum, a colourless abscess *, which burst upon the very slightest touch of the finger, and poured out a lymphatic fluid with a full jet. This clear and limpid fluid, which was plainly watery, must have amounted, according to the most modest calculation, to at least eight or nine ounces†."—The febrile inflammation produced in each of these

* This is what pathologists have thought fit to denominate *a cold abscess* or serous abscess, a term altogether unmeaning, or, at least, inconsistent in the little meaning it has; and fit only to be used, as Bonetus expresses himself, for the purpose of satisfying the vulgar.

† Anno 1679 Martio mense exeunte: Imprudens ancilla cujus cura commissi liberi tenelli, instante vespertino crepusculo per urbis pomoeria circumduxit, frigidiusculoque jam aëre, quem exceperunt excalefacto corpore partim quod hybernas vestes nondum exuissent, partim quod vix à pregressis imbribus lutosam viam eluctati essent: hinc postridie puellus de dentium dolore, conqueritur, Sororum altera tussi corripitur, tertiam febris continua invadit, sed quae pluries singulis diebus exacerbabatur, presertim instantibus vespertinis horis: Febris comites fuerunt, Sopor-lethargicus, insignis genarum rubor per exacerbationes, ad livorem accedens, vomitus morbi initio; Tussis, sed neque frequens neque molestis, respiratio non multum difficilis; oculos obnubilatio et pupillarum concidentia occepavit, quos ex intervallis, diducebat, sed inconniventes erant oculi etsi manus admoveretur, ut visus privationis non minor quam mortis metus immineret: Palpebre livore tincte erant. Duodecim ante obitum horis, qui xii. morbi die contingit, catarrhus, ab exoluto cerebri tono, preceps in pectus ferebatur: Deglutitio preterea difficilis fuit, quae à chirurgo tonsillarum tumori adscripta fuit, etsi ore hiante, etiam ope speculi oris, nihil vitii deprehendere licuerit, ut neque post obitum aperto corpore.

Porro ut de soporis causa amplius constaret, quem ab inflammatione pulmonum aliquando suscitari alibi ostensum, *cerebri claustra quoque diruta, cujus suturae arctiori campagne quam pro aetatis ratione conjungebatur: Cerebrum autem tumentis et elatius observatum*, adeo ut inter membranam duram id obtegentem spatii nihil intercederet: qua distracta, dum ejus sinus et falx inquiruntur, diductaque cerebri parte laeva a dextra, inter corticem et callosum corpus, occurrit Abscessus candicans, ad levessimum digiti attactum disruptus, lympha, inde magno impetu exiliente, limpidissimus enim et plane aqueus humor effusus est, et ut aestimare licuit, ad unciarum octo vel novem pondus; Lethargi per compressionem cerebri et liberae spirituum distributionem impeditam causa.

little creatures by the same careless and unfeeling treatment, was established, in one in the teeth and jaws, in another in the lungs producing cough, in a third in both lungs and brain, that of the brain proving fatal: and it terminated in a pure and simple effusion of serum with that blindness characteristic of water in the head. The clear abscess, described upon separating the two hemispheres of the brain, was plainly the bursting of the thin and much distended ventricles: the age of the child, the cause, the symptoms, and every thing but the title of the case, announce it to be a pure and simple Hydrocephalus.

Examples of such a disease derive a sort of importance from their frequency, and from the uniform tenure of the symptoms, and thence I feel not unwilling to quote again and again the same fact in various forms; but there is one impression I do wish to leave on your minds clear and undisturbed by adventitious circumstances, viz. The uniform tendency of that disease to serous effusion in children which in adults ends often in gangrene or suppuration; I wish also to prove to you how very rapidly the effusion takes place. "I was present (says Bonetus) at the dissection of a boy in the foundling hospital of Geneva, whose head was opened by Mr Bailly. He was a boy of a lively wit, slender, playful, about five years of age; his illness lasted only four days: his first disorder was a pain in the head with a slight fever: on the third day of his disorder, he howled all night long like a dog, with strange tossing and agitation of his arms: during the day he was more composed, but his babbling talk was incessant and unintelligible, so that the attendants believed him possessed, and were ready to swear they heard him speaking Latin and Greek."

"All the viscera being carefully examined after death, nothing appeared to explain his strange disease and sudden exit, till, the head being opened and the scull-cap raised, the brain started out, so that the cranium being laid down again, the brain could by no means be repressed, nor the upper part of the cranium made to meet again with the cut edges of the scull: The marks of the lambdoidal and sagittal sutures were deeply impressed upon the corresponding parts of the dura mater; the veins of both dura

* Anno 1677, 14. mense Maii, dissectus est puer annorum quinque à Magistro Bailly Nosodochii Genevae Chirurgo periit. in Orphanotrophio, me praesente et D. D. de Communis Nosodochii Medico Praestantissimo. Vividi erat ingenii puer, agilis, macilentus, qui per quatriduum tantum aegrotavit. Conquestus est de dolore capitis, cum febre mediocri: Tertia die morbi, noctu ululabat instar canis, cum brachiorum varia agitatione; de die satis erat quietus, sed quid garriret nemo intelligebat, adeo ut assistentes obsessum a cacodaemone esse crederent, Latine et Graece eum loqui asserentes: quae causa fuit quod cultro anatomico expositus fuerit.

and pia mater were turgid with blood, while much was collected in the Torcular and Sinuses. In dividing the brain horizontally, after the manner of Sylvius, and especially in cutting the Corpus Callosum, there appeared an infinite number of bloody points, especially upon compressing the substance of the brain. The neck being divided, and the head cut off, for the purpose of examining the parts of the brain more curiously, much serum flowed from the occipital hole, which had, beyond a doubt, flowed from the ventricles, which were found empty *."

Under the title of "Poignant pain in the head, proceeding from a quantity of pellucid water in the ventricles of the Brain," the following simple but instructive case is narrated. "The little daughter of a certain countess, four years of age, of a delicate frame and bilious temperament, was seized with an ardent fever, without any remarkable disorder of the natural functions; the disorder increased; and on the fourteenth day the child expired. In the ventricles of the brain was found a pound of serum, more limpid than well-water; yet it caused no injury of the principal functions, except that often the child screamed out with lancing pain within the head †."

Thus have I proved, I doubt not to your entire contentment, how prone the brain of delicate children is to this inflammation of its surfaces, and that the serous effusion is rapid, profuse, and fatal. Such is the inflammation of the brain in its simplest state, as produced by accidental causes, let us see how far the disease strictly termed, WATER IN THE HEAD, produced by the same causes, and furthered by peculiar predisposition and temperament, born with the child, hereditary, common to all the brothers and sisters of a family, corresponds in its phenomena with this accidental disease.

OF HYDROCEPHALUS.—The child *born* Hydrocephalic has usually a manifest imperfection in the structure of the head, consisting of softer bones, relaxed sutures, enlarged fontanells, the head peculiarly big, and the face proportionably small: while children subject to the *acute* disease are small, delicate, and sprightly, none have large heads, and never have they the head enlarged by the disease. Hydrocephalus is most frequent about the age of four or five years; but the period during which children are subject

* Bonetus, ex propriis observationibus.

† In ventriculis cerebri posterioribus inventa fuit aquae libra, ipsae puteali magis perspicua, sine operationum principum laesione, nisi quod aliquando de *pungitivo* capitis dolore exclamaret.—*Miscellanea Curiosa, Anni* iv. *observ.* 38.

to hydrocephalus, extends from the second to the thirteenth year. A boy of five or six years of age, lively, ingenious, and active, is struck while running about, in full and vigorous health, among his playfellows, with sudden pain of the head and slight fever: the pain soon becomes intolerable; the boy throws himself upon his bed, or across the table, reclines his head upon a pillow or rests it upon his hands, and often requests his mother to hold it hard with both hands to assuage the pain: the pain, he says, sometimes, is in the forehead over the eyebrows, sometimes in the back head, often it seems seated under the parietal bone of one side: he tosses in that kind of agony and impatience which characterise toothache or any other extreme and acute pain; the cheeks are flushed, the eye watery and hurt by light, the belly costive, the pulse quick and fretful; and often even the very commencement of the pain is attended with sickness and puking.

Thus is the first or inflammatory stage of the disease begun: The child has disturbed and troubled sleep, grinds the teeth continually, and picks the nose; screams out during the night with pain and terror, and often is delirious, and wakens from sleep as children are in all their little ailments apt to do confused and terrified: The pain rages; the child's cries become more acute and piercing; the sickness and puking, especially in the morning and evening, are by the third day more frequent, and by the sixth or eighth the disease is at its achme: the signs of fever and the rapidity of the pulse are greater, and the flushing of the cheek deeper: the sensibility of the eye is greatly increased, the rays of a candle or any sudden gleam of light causes excruciating pain, and the child screams with the torture.

This is the acute state of the disease, which changes its form usually about the fourteenth day: Then the palsy, squinting, and stupor, begin to take place of the delirium and pain: the pulse, hitherto rapid, becomes slow; and the boy, hitherto wakeful, slumbers, and soon falls into a state of coma, often raising his hands to his head in sign of suffering: the vomiting is at first more frequent; the boy lies in a sort of stupor, interrupted only by unnatural and dismal cries, less rational, wilder, and more piercing than at first: he sees double, the pupil begins to dilate, and the eye becomes every moment less sensible to light: there is a constipation from paralysis of the bowels, so that they are never moved but by the use of purges, and a total blindness from paralysis of the optic nerve: the eyes are so turned up that the white alone is seen, and the limbs are agitated by slight convulsions; but

sometimes the eyes squint horribly, while the head and hand are continually turned in convulsive and uncouth motions. Before the boy expires, the convulsions usually cease; he swallows with difficulty, and passes his urine and faeces involuntarily: there is an interval of stillness and insensibility, uninterrupted, except by occasional shrieks: the torpor increases, the limbs are relaxed and palsied, the pupil is still farther dilated, the pulse beats from 120 to 130 in the minute, and becomes at last too rapid to be counted; the face is very pale, the nose peaked, the features shrunk, and the eye quite insensible to light, and the body to pain. This palsied state begins on the eighth or tenth, and the boy seldom survives the twentieth or twenty-fifth day.

Upon dissecting the head, we find the chief exudation upon the internal surfaces: we find the cavities of the brain dilated, its substance proportionally extenuated, three, four, or five ounces of limpid water are found in each ventricle; and this is very remarkable, that if the child die only on the fourth or fifth day during the period of inflammation, the vessels are universally turgid and the effusion small; if his death be protracted to the fifteenth or twentieth day, the period of serous effusion, the veins are little turgid, the red and bloody points havein a great measure disappeared, the plexus choroides are bleached like, and the serous exudation is great.

Such is the state of the organ: Can this be accounted any thing but inflammation of the brain, the headache of children ending in effusion? Or does it differ in any one essential symptom from the headache of the adult? It is a state requiring bleeding, leeches, purges, the warm-bath, and, in its advanced stage, blisters: in its latter period, after the symptoms of torpor are begun, the patient's state is decisive and unalterable. Nothing can be to me a surer proof that Quin had indeed (as has been alledged) written before he had practised, and described a disease the nature of which he did not know, than the following imprudent declaration: "Tutissimum erit EMETICUM propinare, nec non catharticum utpote quae felici eventu exhiberi possitet, si vel vermibus intestina, vel sordibus ventriculus gravantur." I have no doubt this *diagnostic emetic*, this experiment, for discovering whether the disease be from a foul stomach or worms on the one hand, or inflammation of the brain on the other, will have the best effects, if the disease be slight, i. e. if the disorder be in the stomach or bowels: but, if it be in the brain, and the patient be in real danger, it is just pushing him off the brink! launching him into the stream, to swim for life.

Such is inflammation of the brain in a child, where serous effusion invariably accompanies the inflammation, and torpor and convulsion succeeds to delirious pain: By what gradations this state of exudation is connected with the suppurating state of the brain, how entirely the condition of the inflamed ventricle resembles the condition of inflamed cavities in other parts of the body, must next be explained. When the cavities of the peritoneum, the pleura, or pericardium, are inflamed, the general surface pours out a serous exudation; the parts more highly inflamed are covered with a thick and viscid crust of mucous and purulence, while particular points are in a state of ulceration. Such is the mixed form of the disease in fatal inflammations of the greater cavities, such is also, sometimes, the ulcerated state of the cavities of the brain. " A young man, (says Wepfer*), of nineteen years of age, was seized in the beginning of November with headache, and vomited his meals. He consulted the hangman, who prescribed a purging powder, and ordered him to be bled. What other medicines he may have had, we knew not, but, his disorder increasing daily, he was on the 11th of the month brought to the hospital: his fever was but slight, his urine natural; he lay in a deep sleep; when roused, he raved and was delirious: he never asked for food or drink: what was offered, he took: whatever was put into his mouth, he swallowed down: he was fed like an infant. On the 15th, (says Wepfer), I visited him in company with Harderius, and found him in so deep a stupor, that he could in no way be roused: his friends said he slept by day, and waked by night: he passed his urine insensibly, and on the 17th expired.

" Upon opening the head, we found the veins on the surface of the pia mater, where they meet in the third sinus or Tortucular Hierophyli, oppressed with blood, and dilated to thrice their natural size, so that all the upper parts of the

* " Bartholomaeus Feer Triboldinga Turgovius Adolescens novendecim annorum, sartor circa principium Novembr. 1656. capite doluit: assumpta evomuit: hujus causa carnificem consuluit, qui purgans propinavit et venaé-sectionem suasit: an praeterea aliis medicamentis et qua diaeta usus fuerit rescire non potui. In dies morbo in deterius vergente 11. Novemb. ad Nosodochium delatus, fuit; febricitare mediocriter videbatur: dormivit plurimum, expergefactus stupidus quasi erat, et delira loquebatur: nec cibum nec potum petiit: oblatum et intrusum deglutiit: cibandus erat instar infantis. Urina naturali simillima; die 15. Novem. quo ipsum cum Exc. D. D. Christophoro Hardero conveneram, profundissimè dormivit, ut ipsum nulla ratione excitare potuerimus; ajebant adstantes ipsum interdiu dormire, noctu vigilare: attamen inscius lectum perminxerat: In respiratione nullum adhuc dum vitium observatum fuit, die 17. Novem. hora 10. noctis mortuus est.

brain seemed suffused with extravasated blood; yet, upon opening the dura mater, there was no extravasation: the third sinus was remarkably full of blood. Upon cutting down to the level of the left ventricle, there straightway flowed from it a profusion of serum; and upon lifting the fornix, and displaying at once both the lateral ventricles, their surfaces were seen imbued with a viscid purulent humour of the consistence of a thin poultice: the third ventricle was likewise coated with it. The surface, moreover, of each ventricle seemed rough, irregular, and flaccid, and plainly ulcerated; for while I wiped away the pus, (says Wepfer), though with the utmost delicacy and gentleness, I tore up the medullary substance of the brain itself, much altered from its natural whiteness and splendour, and appearing of a yellow or brownish tinge."

Far from delighting in extraordinary and wonderful narratives, I put a value only on such as correspond with the daily occurrences of practice. The case just detailed is of this description, and especially worthy of your attention. A disorder of the head, in a young and healthy lad, is marked by violent headache: the delirium which ensues is not that of fever, for there is little fever, but of violent pain, the inseparable concomitant of inflammation; and all the other characteristic signs of inflammation of the brain are detailed in this narrative with the utmost simplicity. From simple headache, with which the inflammation begins, it passes in rapid succession through all its stages: first, there is, during many days, intense headache; secondly, that state of inflammation is followed by a slight and symptomatic fever; thirdly, the headache and fever are followed by delirium; fourthly, the delirium begins to change to insensibility and stupor, the patient lies lethargic when undisturbed, but when roused, is bewildered, delirious, and raves, which constitutes the true Typhomania or alternation of delirium and stupor; and, finally, the organization of the brain is quite disordered; the occasional delirium ends in permanent stupor, from which the patient can in no way be roused, ending in involuntary discharges of the urine and faeces, and in death. This catastrophe happens within the 12th or 14th day, the prescribed period in which those labouring under any acute disorders of the brain recover or perish: the disease endures for a term intermediate betwixt Phrenitis the most rapid, and Hydrocephalus the slowest, inflammation; and the brain is at once loaded with blood in its veinous system, inundated with water in all its interstices and cavities, ulcerated in its ventricles, their surfaces being coated with pus: the patient dies phrenitic, because phrenzy, surpassing the common degree of delirium, and much

disproportioned to the degree of fever, is the peculiar characteristic of inflamed brain.

Thus have we a second form of inflammation more violent than Hydrocephalus, differing only in degree. But before I forsake the evidences of a pathological fact on which so many other important matters depend, I would prove one circumstance more, viz. that the serous effusion happens when the inflammation runs high so early as the fourth, and is fatal on the fifth, day of the disease. The cause from which such inflammation arises, whether it be from the heats of summer, from fatigue, from quarrelling and passionate altercations, from drunkenness or from blows, or from all these combined, as in the following case, produces no perceptible variety in the symptoms, or form of the disease, only the inflammation is more intense and rapid, the delirium more violent, the oppression deeper; the palsy which precedes death is accompanied with convulsive motions, and those, who are thus suddenly cut off in the prime of life, have the last delirious struggles, the approaching stupor, and the incontinence of urine and faeces, accompanied with profuse perspirations. The brain is found after death oppressed with veinous blood, and inundated with serum; but there is no other mark of disorder than that slight serous effusion which invariably accompanies inflammation in all parts of the body.* " Phillip Gardt, a baker, a well sized and muscular man, but pale andtremulous from frequent intoxication, got into a quarrel; and while he was stooping on account of the blood which streamed from his nose, his antagonist hit him with the fist in the left eye, but he was so little injured, to all appearance, as to go first to the Mayor of the city to make

* Philippus Gardt. Pistor Neukircha Cleggoius: Annor. 44. staturae justae, carnosus, pallidus, poculis deditus, quandoque etiam spiritui vini indulgens: tremulus, quamobrem aliaque symptomata vere usus est medicamentis ex Nasturtio acquatico paratis. Anno 1684. die 3. Jul. hora 1. pomeridiana, dum propter narium Haemorrhagiam Caput pronum tenuerat ab adversario pugno in oculum sinistrum percussus fuit. Adiit mox oppidi Praefectum, ac percussorem, non sine stomacho, graviter accusavit, hinc Chirurgum in suis aedibus convenit, imposuit pulvillum ex stuppa confectum et albumine ovi alumine agitato, additus aq. rosar. et pauxillo croci imbutum. D. 4. Jul. querebatur de oculi punctione et ardore; nihilominus ut hesterna vespera vinum bibit; continuabatur Epithema; obambulavit, quandoque per horulam decubuit. D. 5. Jul. Quoniam ardor et dolor continuarunt, sacculus herbis cephal. et discutientib. infarctus ac in vino albo coctus impositus fuit. Vini potum nondum intermisit. D. 6. Jul. Nunc sana mente loquebatur; subinde deliravit: in manu sinistra inter pollicem et indicem vena, quam balneatores Cephalicam vocant, pertusa fuit: Vesperi Epilepsia corripiebatur, atque iterum noctu D. 8. Jul. De Cephalagia valde querebatur. Mane ipsum convenit Dominus Sybandt Chirurgus nostras: deliravit cum furore quodam, floccos legit, lintea attraxit, de decimis, quae causa litis erant, confusa loquebatur, aestuavit, largissime sudavit; artus, oculi, maxillae

his complaint, which he did in very rude and violent terms, and then to the house of the surgeon, who applied a mass of alumn curd. Next day, he complained of pungent and burning pain of the eye, but in the evening he got drunk again: he walked about, and continued to apply his poultice of alumn-curd. On the third day, a bag of discutient herbs, steeped in white-wine, was applied on account of the continued pain and heat: On the fourth, he continued drinking, spoke sometimes rationally, sometimes wildly: he was bled this day from the cephalic vein, as it is termed, of the thumb: in the evening of this the fourth day, he was seized with epilepsy, and again during the night, complaining continually of deep seated headache: In the morning of the fifth day, Sybant, the surgeon, visited him along with me: we found him furiously delirious seeming to gather mots and hairs, pulling up the bed-clothes, speaking confussedly and incessantly about the tythes, the original cause of quarrel: he was burning hot, and perspiring from every pore; the limbs, the eye, the lower jaw, were strongly convulsed; the tongue was bitten deeply; he asked for nothing, but there was nothing you could present to him he would not drink, even the diaphoretic draughts he swallowed greedily, nor could the attendants refuse him wine in this distressing situation: all night long he raved and struggled, but always when the injured part was touched, he withdrew his head, and that even when he was expiring. On the morning of the sixth day his neck was stiffened, his eye fixed and motionless, he knew no one, nor did he wink or shut the eye-lids when the hand was passed across them; when pinched and tormented, he seemed insensible, yet he moved his limbs a little, sometimes muttered, and sometimes cursed: when they hollowed into his ear, he seemed unconscious; and a little before he expired, he spit out, though feebly and difficultly: at two in the afternoon he expired without a struggle."

"Upon cutting the integuments, their cellular substance seemed watery and gelatinous: the hurt eye was greenish and livid without, but there was no mark of

convellebantur, linguam morsu valde vulneravit. Abradebantur capilli, brachiis imponebantur Vesicatoria: nihil postulavit, oblatum tamen potum deglutiit, etiam Aquam diaphoreticam: nec in hoc rerum statu adstantes ipsi vinum denegarunt: multum sanguinis exspuit. Tota nocte deliravit: si circa locum affectum attingebatur, caput amovit idque etiam adhuc paulo ante mortem. D. 8. Jul. mane collum abriguit, obtutus fixus, neminem agnovit, digitis ad oculos admotis, non nictitavit, nec vel minimum percellebatur: Vellicatus nullum sensus indicium praebuit, artus subinde movit, loquebatur incongrua, subinde juravit; inclamatus nullum auditûs signum praebuit. Paulo ante obitum, sed imbecillus, exspuit. Hora 2. pomeridiana mortuus est placide.—*Wepfer, Observatio iii.*

injury within, the ball of the eye being sound, the socket without extravasation: within the scull there was no extravasation, nor under the dura mater, nor among the convolutions of the brain, nor one drop of extravasated blood on the basis of the brain; but all the veins and arteries and sinuses, and especially the artery which mounts over the corpus callosum, and the veins of the plexus choroides, were turgid with blood; and betwixt the pia mater and the convolutions of the brain, there was much extravasated serum, some fluid, but chiefly gelatinous."

Wepfer judiciously imputes the condition in which this man died, less to the blow than to his habitual vice of drinking, to that effervescence of the blood manifested by the haemorrhagy from the nose, (which came on at mid-day, in consequence of heat and drunkenness,) to those noisy quarrels, struggles, and altercations, which preceded and followed the blow; to the passionate complaints he made before the magistrate, and to the continued intoxication of the succeeding days; but Wepfer concludes with a remark altogether surprising: "The symptoms preceding death were furious delirium and convulsions; but there were found, on opening the cranium, no marks of inflammation, no appearance of extravasation, (Ejus signa, dum vixit, non obsura erant delirium cum ferocia et convulsiones, quamvis nihil inflammati, nihil extravasati intra cranium repertum fuerit). What are signs of inflammation, if furious delirium be not? What are the marks of it in the brain after death, but distended vessels and serous effusion? What are the signs of inflammation in any of the cavities or organs of the body, but disordered function, pungent pain, and extravasation or serous effusion into the cellular substance of the part?

But I proceed to remark a thing of greater moment, and it is this: You will invariably observe, that wherever congestion arising from high action in the vessels of the brain is taking place in the veins; wherever inflammation terminates in that state which resembles gangrene of the external parts; wherever the veins are dilated and the substance of the brain blackened, where in short the Sphalismus Cerebri or gangrene of the brain, mentioned by Hippocrates, has come on, the patient falls into a deep immoveable stupor: When, on the contrary, this stage is anticipated by a serous exudation, where a disease resembling the hydrocephalus of boys takes place in the adult, the patient retains, to the last moment of his existence, a degree of sense and intellect, and often I fear continues sensible to the last offices of friends, and to their lamentations and discourses, long after he has ceased to give tokens of consciousness; so it surely was with this man, who was able to relieve himself of the saliva by spitting, though feebly.

I know that in many of those narratives, and in some of my observations, you will find recorded, pictures of disease which will be useful in your future practice, which will present themselves to your imagination whenever the scene is renewed, and will assist you to judge truly of the danger of your patient, and of the condition of the brain. Pain and delirium, even convulsion itself, is different in the child and in the adult; that condition of the brain which is in the child, denoted by wild unnatural screams, is accompanied in the adult with loss of reason, delirium, and fury; but so gradually does the serous effusion take place, so slowly are the faculties obscured, that the phenomena are altogether peculiar, and such as cannot be misinterpreted.

When, in either sex, headaches have been a habitual ailment, and have, by confinement and suffering, brought the system to a delicate, feeble, and irritable state, be assured that life is held on a precarious tenure: do not then unfeelingly ascribe to capriciousness of temper disorders which arise from physical disease; do not, by indifference to slighter ailments, make yourself responsible for the afflicting scenes which may ensue, nor imitate those who give emetics, (the most violent and often the most dangerous of all remedies,) with the same indifference as a placebo is usually given. When habitual headaches arise to any unusual pitch, they are never void of danger: when they have but short imperfect remissions and terrible exacerbations; when the pain of the temples makes the face pale and haggard, the pulses small, and the extremities cold; when each returning menstruation in women, or every attempt at business or exercise in men, occasions a new and terrible paroxysm; when, after days or weeks of suffering, accompanied with perturbed sleep and fearful dreams, the patient begins to be slightly delirious during the night, and giddy and sick during the day, effusion of serum is threatened! when the delirium begins to be mixed with stupor, it is actually begun! the ventricles are already enlarged, the structure of the brain irremediably injured! and the last scene, which lasts for weeks, is very agitating. The headaches do not cease: slight screams, a sort of stupor and fainting attend each paroxysm of headache: a flushed cheek, and accelerated but feeble pulse, warn you of the returning pain, and frequent sickness follows each return, till at last the patient lies insensible, unless when forced to reply, or when called to take food or drink: This horrid sign distinguishes this peculiar kind of stupor, that in the adult, as in the hydrocephalic child, a voracious craving makes every thing acceptable; whatever is offered is swallowed. When the effusion has begun to oppress the functions of the brain, the sickness of the early stage ceases: you begin to observe irregularity and indecision in the pointing of the eyes, and confusion and

trembling in the motion of the hands: the patient is no longer offended with light: the vision is plainly indistinct: he hears imperfectly, and answers slowly and with frequent sighing: the tongue faulters, and you can perceive that the ideas are more correct than the expression, the patient often using misplaced words, which he seems conscious are misplaced: the faeces and urine begin to escape insensibly; he lies with his head low, his eyes closed, his breathing is slow, oppressed, and accompanied with sighing: he is perpetually fumbling with the clothes, or picking them, as if gathering mots with the finger and thumb; and as the insensibility increases, one hand, though not palsied, generally lies still and dead, while the opposite hand is in perpetual motion, grasping irregularly, and trembling; this perpetual groping and trembling of the hands is the most fatal sign of all. At last the stupor is complete: there is "no more moving:" the urine and faeces no longer pass unconsciously: the bladder and the rectum are now paralysed as well as their sphincters, the bladder rises sensibly distended above the pubis, while the stomach and bowels are swelled with flatus, and this takes place usually twenty-four hours before death. The putting out of the hands, the fumbling, groping, and trembling, is a fatal irreversible sign; when this appears, though but in a slight degree, the patient is surely to die. The brain is found, upon dissection, to have its veins conspicuously dilated with black blood, and appearing in great number, while a profusion of serum distends the ventricles, and inundates all the surfaces of the brain.

Thus, you perceive, the inflammation which ends in serous effusion, is the same in the adult and in the child; and you may easily anticipate another truth, if what I have already said be true, viz. That nothing farther is required than a higher degree of arterial action, a more intense and rapid inflammation, to alter at once the form and name of the disease, for the patient, whether adult or child, who is cut off on the fourth or fifth day before the effusion or palsy take place, dies in the phrenitic stage, raving and struggling, sometimes with actual sphacelus of the brain. The inflammation, which protracted to the fourteenth day, is stopped by serous effusion, and ends in hydrocephalic palsy, and convulsion terminates, if but a little more violent, on the fourth or fifth day, (after phrenitic delirium,) in complete stupor, from blood so impacted into the vessels of the brain as to be equivalent to gangrene of a less important part, Hydrocephalus and Phrenzy are indeed two shades of one disease: hydrocephalus or serous effusion stills the arterial action by which it was produced by at once emptying the vessels, compressing them (by filling the cellular interstices,) and deadening the energy of the brain; but the phrenitic state, a state of

much higher excitement, by gorging the vessels beyond their power of action, ruins the organization, and causes a more sudden death, as the case I shall now relate to you will prove: the ventricles are, in the case of Sphacelus Cerebri, filled in some degree with water, because serous effusion is inseparable from all states and stages of inflammation, but Gangrene, inequivocal Sphacelus of the brain, is the disease of which the patient actually dies. "The subject of this following case was a delicate girl of six years of age, of an unhealthy constitution, a pale and sallow complexion, an insatiable appetite, a speedy digestion, and exhaling an acid odour in perspiring and from the faeces; a child, in short, of a lax unhealthy habit, subject to acidities in the primae viae. She had the confluent small-pox, succeeded by a lingering second-fever, which required tonics and the bark. After the fever left her, there came out small boils on various parts of the body, of which some suppurated, others disappeared."

"Recovered from these reliquiae morbi, she was carried to the country, where, by the help of tonics and antisceptics, she regained her health. Through all the succeeding winter, which was severe, she was afflicted with colds, rheumatism, and cough; and she exposed herself, on the approach of Spring, by going out from much heated chambers into the open air, irregularly at all hours, and when the bleak cold winds of Spring began to blow."

"It was on the 15th of May, towards evening, that she first complained of a very acute pain of the head, extending from the vertex to both ears, but especially to the right, which also appeared somewhat swelled: Then ensued bilious vomiting, and a very restless night.

"Next day the pain continued, the urine was pale, crude, sparing in quantity, and unconcocted; the pulse quick, hard, intermitting; she spoke little, and was delirious: she was slightly recovered by a lenient purge: she had a sort of shivering at mid-day, followed by universal pains: the fever rose, became intense, her senses were quite oppressed, she rejected whatever was offered to her except lemonade, which she swallowed greedily: being bled from the arm in the evening, the blood was found to have the buffycoat; blisters were next applied behind the ears, but they procured not the slightest relief; as the night advanced, the face swelled, but without redness, the eyes werefixed and prominent, the breathing interrupted with sighing, she groaned much, and lay stupid and oppressed."

"On the third day leeches were put to the temples, a blister was applied to the head, and rubefacient plasters to the legs and soles of the feet. Towards mid-day

the feet grew cold, but in the evening they seemed to partake of the heat of the fever which was then intense over all the body. When spoke to, she moaned, but could not answer: she tossed from side to side in bed; her limbs were agitated and in continual motion; she struggled sometimes with her legs, sometimes with her arms; at times she started out of bed, and tore her hair and face with her nails; towards evening the leeches were applied again, not to her temples, but to her nostrils."

"On the fourth day the glisters given generally for nourishment were suddenly rejected: at mid-day, while the head was burning hot, the extremities were cold; the pulse became quick, weak, irregular, and intermitting; the breathing was oppressed and stertorous, and she fell into total insensibility and coma: as the night advanced, the fever kindled again; the feet were bathed in hot water, and cold solutions were laid upon the forehead."

"On the fifth day the symptoms, still the same, were so much increased, that the child was plainly dying: about mid-day, she had a natural stool, and seemed relieved, restored as it were from the very jaws of death: but she was seized during the night with convulsion; the body was bent backwards, every thing looked desperate, and next day, her strength gradually declining, she expired."

The dissection was at the instance of Bursarius, and under his inspection performed by one who seems to have been a favourite pupil, Caietanus Vindemarius, now physician in ordinary to the Infirmary of Vienna. How many physicians in ordinary to Infirmaries could I name, who know not the Pineal from the Pituitary gland. The evidence in this case is unexceptionable to the important fact of the brain being truly in a state of gangrene. "*This little girl (says Bursarius) of six years of age, died on the fifth day, of gangrene of the brain. Upon dissecting the body, the dura mater was found to adhere so to the cranium, that it was with much difficulty pulled away. The blood vessels of this membrane were extremely dilated, and very turgid with blood, while the pia mater, much harder than natural, actually cut with difficulty, and those membranes being raised up, the cortical substance of the brain on its upper part was manifestly gangrenous and corrupted, of a leaden

* Bursarius says of this girl in another passage, Puellae sexennis, quae ex *sphacelismus cerebri* intra quinque dies obiit, Cadaver sectum est. Dura mater cranio ita adherebat, ut difficillime divelleretur. Ejus vasa ablato cranio, sanguine plurimum distenta et praeter modum turgida apparuere. Pia mater aliquanto durior solito inventa est, sic ut aegre discindi posset. Remotis meningibus, superior loborum cerebri corticalis pars *plane corrupta et putrida, coloris plumbei* reperta est sine ulla puris effusione. Medullaris substantia quoad discerni potuit intacta erat."—*Bursarius*, §. 172.

colour, without any appearance of pus, while the medullary substance of the brain was, as far as could be perceived, entirely sound. " In the ventricles, nothing was found particular except a slight effusion of serum, occupying those of the cerebellum."

Now, a new and interesting scene opens to you: you are conscious that the symptoms of inflammation of the brain vary, while the action is the same; that it is different in the sanguine and in the sallow, in the child and in the adult; that inflammation of the brain according to its various aspects, or stages, or terminations, forms many diseases; that it is HYDROCEPHALUS when terminating, as it usually does in boys, slowly in watery effusion: it is SPHACELUS when terminating, as sometimes it does in young men, after long travelling in the sun, or deep debauches, and especially in warm climates and in plethoric and vigorous habits, in gangrene of the brain, a sudden and terrible death. It is VOMICA or abscess, when terminating (as often it does after local injury proceeding from slight extravasations of blood or serum,) in partial suppurations of the brain *.

OF PHRENITIS, SIDERATIO, OR SPHACELUS CEREBRI.—Names conduce infinitely to explain or to confound; and those, I am sensible, which have been appropriated to this disease, are better calculated for the latter purpose than the former, for they express sometimes the cause of the disease, sometimes the symptoms, sometimes the state of the brain, sometimes the particular stage of inflammation. It is this variety of names that gives the semblance of many diseases to an affection which is one and uniform in its nature. We cannot wonder that physicians practising

* In place of ascribing such phrenitic delirium to the inflammation of the brain, the ancients universally ascribed this and all other disorders of the head to black or yellow bile coursing through the body, and especially disordering the brain; and to prevent its generation, particular diets were recommended, and particular kinds of food prescribed. Galen formally and decisively forbids the flesh of dogs, goats, bulls, camels, dromedaries, boars, asses, and wolves, which mankind have long ago ceased to prey upon, and he has forbidden other magnificent dishes, as of sea-calves, and dolphins, and all kinds of whales! These are not fashionable, even at the tables which could afford them, our hospitable nobility of England never going higher than a roasted ox.

Porrô qui sanguinem melancholicum gignunt, hi ferè sunt, caprina bubulàque caro, magisque hircinae et taurinae, sed maximè asinorum et camelorum carnes: itemque vulpinae et caninae. Magnum ad hujusmodi sanguinis generationem momentum adfert etiam leporis esus, sed multo magis aprorum. Limaces quoque sanguinem melancholicum pariunt, si frequens sit eorum usus. Praeterea omnium animalium terrestrium carnes sale conditae: necnon aquatilium carnes, ut Thunni, Balenae, Vituli Marini, Delphini, canis, atque cetaceorum omnium.

in various and distant climates or ages, Hippocrates in Greece, Rhazes in Arabia, Alpinus in Egypt, Bontius in the East Indies, Bonetus, and the authors he quotes, in Italy and Germany, should have used very dissimilar terms: It is pathology alone that can prove the unity of the disease, or reconcile the discordant names and descriptions of antient authors; but it will serve as a key to many difficulties in your future studies, if I make you understand the reasons of these names. The disease is named PHRENITIS from the state of the intellect, from the delirium, the raging delirium or phrenzy, accompanied with intolerable pain, in which the patient tears his hair and his flesh with his nails: It is named Sphacelus Cerebri, SPHACELESMUS, from the state of the organ, from the blackened and gangrenous condition in which some part of the brain is usually found, often livid, as in the case lately narrated, or of a greenish purple mixed with specks of suppuration. That this term Sphacelesmus Cerebri should be the term under which Hippocrates describes phrenzy, proves an acquaintance with pathology among the antients, a familiarity with dissection, and a long suit of observations; and it proves also that there had existed a strong persuasion, from the earliest times, that wherever the delirium runs rapidly into stupor, wherever the patient, having inflamed brain, dies on the third day, there must be gangrene: It is named SIDERATIO, SYRIASIS, in consideration of the cause, from the disease being peculiar to warm climates and sultry seasons, its arising from exposure to the intense heat of the sun, and raging under Syrius or the dog star, from the death of the patient being sudden, as if planet struck, and that sudden death being preceded by the most savage madness with howling, struggling, striking, and tearing his own flesh, and from the death of the patient being often accompanied by no visible marks of injury even in the cases of the most sudden and violent deaths, except over-distention of the vessels and general turgescence of the blood in the brain, or only dark coloured places or spots on its surface: the disease is, from the same observations, named Morbus Solstitialis, as epidemic in the most sultry season of the year.

But phrenzy is the inseparable sign, the mark of the disordered function: this must characterise inflammation of the brain, in the adult, in all its stages, and should be the generic name. Phrenitis is sometimes defined an inflammation of the brain, accompanied with unremitting delirium and acute fever, generally commencing in headache*,"

* Est genus phlegmasiae, acuta pyrexia et delirio perpetuo insignitum, a cephalalgia atroci ut plurimum incipiens: definitur vulgo mentis alienatio continua cum febri acuta. I. R. Fortis.

an excellent and brief definition, since it connects the affection of the intellect with that of the organ, and implies that the fever is symptomatic, and the headache and disorder in the brain the cause of the disease. Yet such a definition is of no avail in practice: it serves but to distinguish the disease to those who know it, not to delineate the varying and terrible phenomena accompanying the first affection of the brain, or the trembling and stupor which succeed to these first symptoms in proportion as the vital powers decline.

The characters of this inflammation are strongly expressed, though its approach is after a manner which would give you no alarm: the patient is slightly disordered in his intellect, his face is pale, his eye wild, his countenance gloomy, his hands trembling, his lips and eye-lids quivering, his temper irritable, his motions expressive of trifling impatience rather than of violent passion: he is agitated and restless, puts off and on his cloaths without knowing what he is doing, rises and goes to bed frequently, and when prevailed with to lie, is restless, agitated, and falls into mean, senseless, and idiot-like babbling, which is the first stage of this terrible delirium.

In the second stage, there are marks of fever, at least a white tongue, a burning skin, and a little and quivering pulse: the pulse rises, the eyes are muddy, gory, and inflamed, the patient is more restless and agitated, tosses incessantly from side to side, and pulls up and kicks away the bed-cloaths, spits and grinds his teeth, and mutters, but without any wild cries: his voice, when he speaks, is sharp, piercing and impatient: he seems insensible or indifferent to whatever is said or done about him: his eyes are in perpetual motion, his head turning incessantly from side to side: he sputters the frothy saliva from his mouth, grasps at every object, and at the same time trembles with his hands, and continues muttering and slightly struggling, though he takes drink, or obeys your commands in lying still or preserving decent postures. But, after ten or twelve hours, or in the course of the second day, he starts out of bed, struggles with the attendants, with irresistible strength and fury, strikes, kicks, and bites equally the hands of his attendants or his own; twists and turns from their grasp, tears his hair and his face, speaks with inconceivable rapidity of utterance, and with a length of breath truly surprising; but it is not madness, for he has no jealousies, expresses no passions, strikes and kicks indifferently at every object animate and inanimate, bites indifferently at your hand or his own, drinks whatever unpleasant thing is presented, and often bites the cup; and his hurried talk is a string of unmeaning alliterations, pursued from sound to sound, without end or intermission, for the moment he draws breath, he begins again: he grins and shows his teeth, and sputters the saliva continually.

From the first moment of the phrenzy he never sleeps; there is no distinction of night and day, and a succession of attendants are exhausted; from time to time he bursts out of bed, and then subsides into a state of comparative silence and torpor, but unremittingly agitated, trembling, and bedewed with sweat.

When those intervals of torpor become more frequent and long, the third stage is begun: his shrieks, and shrill cries subside into muttering and grinning, his eyes moving still impatiently, his head in perpetual motion, his lips quivering, his hands trembling, he begins to fumble with the bed-clothes, and pick mots: the eye, before prominent and inflamed, deadens and subsides; the body breaks out into profuse sweats: the voice is tremulous, and sobbing like that of one immersed in cold water: the visage pale and grim, the hands cold and clammy, and the faeces and urine pass involuntarily; the profuse sweating bakes the hair, so that it stands up in points and forks, wild and disordered with struggling; and thus, after an interval of stupor or stillness, the patient expires generally on the third or fourth day.

This is the disorder of the intellect and of the nervous power, inseparable from inflammation of the brain, and forms too true a picture of the manner of the patient's death. Every symptom is to be taken in conjunction to form a right estimate of the disease. I have often observed, that wherever the raving stops short of the most furious struggles the patient is saved: yet, deep stupor, succeeding to maniacal struggles, is invariably a fatal sign: Though the picking of flakes from the bed-clothes, towards the close of a low and gentle typhus, (as the recovery of Galen himself proves)*, is not essentially a fatal symptom, yet, after a scene such as I have described, it portends death.

It is natural to resort now to the ancients, to see what descriptions they have left us of the more critical disorders of the brain; for sudden and fatal affections of the brain seem to have been peculiarly frequent among a people living, as the Greeks did, in a warmer climate, using the most violent exercises under the meridian sun, and usually plunging into the water when covered with sweat and dust. The writings of Hippocrates abound with repetitions, but they are the repi-

* In the warmer climate of Greece, this degree of insensibility and palsy, for such I judge it to be, in which the patient grops and picks the bed-clothes, was more certainly a fatal sign than with us; and their phrenitic or delirious fever was usually fatal by the fourth or fifth day: Yet Galen escaped after lying in this condition. "Alii rursus cogitatione falluntur minime, sensibus tamen hallucinantur: id quod mihi olim contigisse videtur, cum ardenti febre laborans et floccos vellerem, et in vestibus festuccas colligerem, idque animo constans."—*Galen, de Locis Eff. lib.* iv. "Galen tells

titions of a faithful and diligent observer, over anxious, perhaps, to mark the slightest varieties of disease : he is especially copious in delineating the diseases of the head : You must know the complexion of his life and writings, to value them up to their standard : he was not occupied in such a trade as medicine now is, but zealous and faithful in the discharge of its essential duties ; each individual case he recorded upon the spot ; at the end of every season he called himself to a strict account, by revising these several histories, and observing the general complexion which the epidemic diseases of the season had assumed : his clinical observations and histories, or his Books, as they are intituled, on Popular Diseases, in which he recites at once the course of the season, the state of the winds and the air, the prevailing epidemics, and the particular way in which his friends and patients were affected, the places of their abode, their condition of life, the immediate causes of their fevers or other diseases, and the manner of their recovery or death, form the most authentic and far the most valuable of his writings, and are an eternal reproach to the busy triflers of modern times. It is from Hippocrates that Sydenham, the first among the moderns, takes his notion of epidemic constitutions of the air. Hippocrates, as he was the most diligent observer of nature, produces the truest and most lively pictures ; and whatever repetitions may offend, whatever imperfections may appear in his writings, are to be accounted for by the peculiar circumstances or the peculiar frame of mind under which he composed his works. The science was as yet uninformed, there were no precedents in writing, no descriptions nor general views of disease, to regulate his method : and he hardened his stile by endeavouriug to concentrate each description into an aphoristic form, and to conjoin in one sentence a picture of the disease and a prognostic of the patient's fate.

Hippocrates studied carefully, and expressed minutely, first the general forms, and next the minuter features of each disease : Fever, headache, and phrenzy,

this passage of his life more circumstantially in another part of his works : Contrarium affectionem non solùm in aliis, verum in me ipso, cum adolescens adhuc essem, expertus sum : cum enim per aestatem ardente febri laborarem, et festucas atro colore ex cubili eminere, et floccos similiter in vestibus esse putarem, quos auferre tentans, nihilq ; sub digitis eductum inveniens, accuratius, vehementiusq ; id efficere conatus sum, audiens itaq ; duos ex amicis qui aderant, dicentes : Videsne hunc jam, et floccos evellere et festucas colligere, statim intellexi, quod dicebant me fecisse. Cùm vero sic animo constarem, ut rationalis in me facultas non vacillaret : rectè, inquam, dicitis : proinde ne phrenitis me arripiat, auxilio estote. Illi autem cum idoneis rigationibus caput foverunt, tota die, sequentiq ; nocte gravibus insomniis turbatus sum, ut interim et clamare, et exilire viderer : verum postero die mitigata erant omnia accidentia.

seem to have been the epidemic diseases of his country; he delineates first, under the general head, ("MORBI A CAPITE FIENTES,") and in successive sketches, under distinct titles, ("Alius atque alius morbus,") all the varieties of these diseases, febrile, accidental, or epidemic. You will remark that, in the epidemics of Greece, every disease was accompanied with fever, and every febrile delirium was preceded by pain. "One form of disease (says Hippocrates) begins with rigors, pain of the head, and fever, the pain being seated chiefly about the ears and temples, extending towards the top of the head: the eyes are pained, the eye-lids heavy, the head loaded: the patient, upon being stirred, voids his urine, which flows easily: he lies in a state of stupor, the veins swelled, and the temples throbbing: he is restless, sighing, delirious with pain: sometimes he is relieved by a discharge of thin pus, but without this he dies on the seventh day. It is a disease which usually accompanies the relapse of a fever, especially when occasioned by the omission of purges, by remaining exposed to the sun, or by excess in wine.*"—"In another form of the the disease, when the veins have surcharged the brain with blood, so as to inflame that organ, a strong fever ensues, with pain of the sinciput and temples, extending backwards; tennitus aurium, dulness of hearing, anxieties, and perpetual and restless tossing, from excess of pain; and on the fifth or sixth day the patient expires †." We are struck with these repetitions of Hippocrates, for they prove at once that he referred the most frequent epidemics to the state of the brain, and felt the utmost anxiety to express the very minutest features of the universal disease of the country and climate in which he practised. "In another form (says Hippocrates) of the disease, the brain being corrupted, the pain extends along the spine from the nape of the neck, the coldness descends to the heart itself, the patient breaks out suddenly into sweat, while blood flows from the nose: many vomit, and

* Alius morbus, *rigor, dolor, et febris per caput*: maxime ad aurem, et ad tempora, et ad sinciput, et oculorum regiones dolet, et supercilia ipsi incumbere videntur, et gravitas caput detinet, et si quis ipsum moverit, minget, et multum, ac facile mingit, et dentes torpent, et stupor ipsos tenet, et *venae attolluntur, ac pulsant in capite, et non potest quietus esse*, sed anxius est, ac desipit prae dolore. Huic si quidem per nares, aut aures eruperit, aqua profluit subpurulenta, et sanus evadit. Sin minus, plerumque in septem diebus moritur. Hic morbus maxime fit ex febre lypiria, quum liberatus a febre, nondum purgatus, aut cibis se impleverit, aut inebriatus fuerit, aut in sole laborarit.

† Alius morbus. Si venae circa cerebrum sanguinem superevomuerint, ac cerebrum calefecerint, febris emergit fortis, et *dolor ad tempora*, et sinciput, ac posteriorem capitis partem; et aures tinniunt, *ac flatu implentur, et nihil audit, et anxius est, et se ipsum prae dolore jactat*. Hic quinta, aut sexta, die moritur.

those who are thus affected expire on the third day. *" The shivering, inquietude, restlessness, and fever, the commencement of the disorder in pain, its progress to delirium, and its fatal termination by the seventh day, characterise a disease not purely phrenitic, not merely febrile, but accompanied, (as in all the febrile diseases of that climate,) with a decided inflammation of the brain.

Hippocrates proceeding from febrile to local and particular diseases, (De febribus universis a me dictum est, de reliquis jam dicam,) proceeds to give a description of Phrenitis, or fatal delirium from inflamed brain, as full and perfect as has ever since been sketched: " When the brain is tumid from inflammation, the whole head is pained, principally where the inflammation is, but chiefly concentrating about the temples: there is tennitus aurium; the hearing is obscured; the veins swell and pulsate; there is always fever, sometimes rigors, and headache is never entirely absent, though sometimes it remits and sometimes is more oppressive: the patient howls and rages with pain, bursts out of bed, then quickly throws himself down again on his bed, and tosses with agony. This is a deadly disease; but on what day the patient may expire it were hard to tell, since some die early, others later, but usually before the seventh day; when they pass the twentieth day they escape. †"

* Alius morbus. Si cerebrum corruptum fuerit, dolor ex cervicis, nervo ad spinam tendit, et ad cor frigus descendit, et derepente novus sudor adest, et per nares sanguis fluit. Vomunt quoque multi. Hic triduo moritur.

The Greek and Arabian physicians were in the practice, in diseases of the brain, of establishing an issue in the forehead, by running a spatula or flat knife betwixt the scalp and the scull, and sealing it up with a pitch plaster for seven days, unless the pain of the head continued. This savage operation shows how desparate they thought the disease. The best descriptions are in Albacasis the Arabian. The following is from Hippocrates: " Quum igitur sic habuerit, deraso capite, si non calefactoriis cesserit, frontem ea parte, qua capillus desinit, a capite findito; ubi vero secueris, disparata, ac diducta cute, quum sanguis defluxerit, salem tenuissimum inspergito, et postquam effluxerit sanguis, fissuram camponito, et duplici filo totam ipsam includito. Deinde splenium cera, ac pice illitum, ulceri imponito, et lana sordida superimposita deligato, et ad dies septem ne solvito, si non dolor vexet: si vero dolor adsit, exolvito.

† Quum cerebrum ab inflammatione tumuerit, dolor totum caput occupat, maxime qua parte constiterit inflammatio. Consistit autem in temporibus; et aures sonitu implentur, et auditus hebescit, et venae extentae sunt, ac pulsant, et febris, ac rigor aliquando corripiunt, et dolor nunquam *deficit*, sed quandoque remittit, quandoque magis premit, et vociferatur, *ac exilit prae dolore. Et ubi surrexit, rursus ad lectum decumbere festinat, et jactat se ipsum.* Hic lethaliter quidem affectus est, in quot vero

Such is the disease which he describes under the title of HUMOR CEREBRI: But the condition of those who are struck the most suddenly, and die the most immediately, remains to be told; it also is distinguished from apoplexy, or any state but that of inflammation, by the intense pain. The SYDERATI is the title of the description, which runs thus: "Those star-struck, as is usually imagined, in whom the head is loaded with foul and corrupted humours, never reach the seventh, but perish on the third or fifth day: the pain is felt first in the fore part of the head: they become blind, sometimes of both eyes, sometimes of one: they are stupid and delirious, with throbbing temples, a slight fever, and the body powerless; if they survive to the seventh day, they live. *" One description more I cannot refrain from laying before you; it is that of a kind of stupor so sudden, so deep, so apoplectic, (yet characterised by preceding pain,) that it expressly resembles the Coup de Soleil of our colonial territories: "One in health is suddenly struck with pain in the head; becomes speechless; snores with open mouth; when spoken to or stirred, he only sighs; he is altogether senseless, and passes much urine, which flows unconsciously: if not seized with fever, he surely dies upon the seventh day. †" So deep a stupor, so violent a headache, so total an absence of fever, ascertains the nature of the disease, and the prognostic is the most singular proof of its nature, for wherever the disease lies merely in the brain, the patient invariably dies; it is only when it is febrile that he survives.

I find no authority in the books of nosolgists, nor in the book of nature, to vindicate nice or curious distinctions; but there are certain broad and discernible marks of character, which though time and experience might teach you, I think it right

diebus morietur, non habet judicationem. Nam alii aliter pereunt. Plerumque tamen in septem diebus moriuntur. Si vero vigesimum primum effugerint, sani fiunt.

* Qui icti, ac syderati esse dicuntur, quum cerebrum multa immunditia vitiosorum humorum repletum fuerit, anterior capitis pars *primum dolorem* ipsis exhibet, et suscipere non possunt, aliqui ambobus oculis, aliqui altero, et sopor ipsos tenet, et desipiunt, et tempora saliunt, et febris tenuis habet, et corporis impotentia. Hic tertia, aut quinta die moritur, et ad septem non devenit. Si vero devenerit, a morbo liber evadit.

† Alius morbus. Sanum derepente invadit dolor circa caput, et statim vox intercipitur, et stertit, et os hiat; et si quis ipsum vocet, aut moveat, solum suspirat, nihil autem intelligit, et multum mingit, *et mingere se non sentit. Hic si non febris ipsum corripiat, in septem diebus moritur.* Si vero corripiat, plerumque sanus fit.

to describe; for as the brain is primarily or secondarily affected, we have varieties of the disease differing essentially from each other, insomuch that I have no difficulty in affirming this as an universal prognostic, that, "Wherever in Fever there is much phrenzy, such fever partakes of the dangers essentially allied with every affection of the brain: that in Phrenzy, on the other hand, while there is much fever, there is less danger, since the phrenzy is not idiopathic, but partakes of the nature of fever: But where the phrenzy is, independent of every other affection, unaccompanied with fever, a pure idiopathic disease beginning in severe pain, it is almost invariably fatal." I am inclined to distinguish three species of the disease, the Febrile Phrenitis, the Cephalagic Phrenitis, and the Maniacal Phrenitis. My reasons for proposing these distinctions must appear in the description.

Of Febrile Phrenitis or Fever of the Brain, in which fever is more conspicuous.—This is one of the diseases from which youth, health, and strength, are far from being a protection: it appears in the vigorous and athletic: it arises from passion and agitation of mind, from quarrels, drinking, and debauchery; from hard labour or furious riding in the heat of the sun; from long and rapid journies in the heighth of summer, or in the sultry days of autumn; from hunting and walking expeditions usually undertaken in the season of the year most unfit for such amusements; most frequently of all from athletic young men trying their strength, walking for a wager seventy or eighty miles, and too often concluding the feat with a debauch of wine.

When the brain begins to be inflamed, the head is hot, the eyes red, the face pale; there is a feeling of langour of body and imbecility of mind quite unusual even in fever; and the affection of the brain is conspicuous even in the first hours of the disease, in the giddiness, tremors, fainting, imbecile and babbling talk, and a species of fatuity or idiotism, the *desipientia levis*) with which the disease begins.

As yet there are no signs of fever except a bitter and parched mouth, a fluttering pulse, and a dry skin; but, from the moment of being seized, the patient is sleepless, tossing, passionate, impatient, and slightly delirious; on the second day, he struggles to get out of bed; the delirium rises every moment; and after striking and struggling with demoniacal strength and fury, with an inflamed visage, his hair standing on end with the struggles and the moisture, sweating at every pore, and very generally having profuse haemorrhages from the nose, and fauces, he falls down at last into a temporary stupor, and lies bathed in clamy sweats: sometimes he recovers a degree of reason; usually the interval is past in still-stupor with slight muttering;

for two days more, this torpor is occasionally interrupted by paroxysms of the most furious phrenzy, constituting the true Typhomania, viz. alternate phrenzy and stupor: He at last sinks altogether: the haemorrhages cease, or cease at least to be active, in place of a profusion of florid blood, black ichor issues from the throat and nostrils: the stupor increases; he mutters continually, and picks the bed-cloaths; begins to pass his urine and faeces unconsciously, a subsultus tendinum or slight and tremulous convulsion affects the whole body, and he expires on the fifth or sixth day. Thus, the brain fever of this climate, though it is truly a febrile inflammation of the brain, degenerates very early into stupor, coma, and subsultus; and thence it is, that the terms brain-fever and low-fever are now generally received as synonymous. The stupor and palsy of the sphincters, with the subsultus tendinum, are mentioned as the signs of the lowest state of debility, and the haemorrhages as a sign of the dissolved state of the blood.

I have already told you that this febrile inflammation of the brain was the great epidemic in Greece; and I take a pleasure in at once exemplifying the disease, and making you acquainted with the manner and stile of Hippocrates, by transcribing one of his cases:

"Erasinus, living by the Torrent of the Bootes, was, after supper, seized with high fever, was perturbed during the night, passed the following day more quietly, but the succeeding night he was in great disorder: on the second day, he was in all respects worse, and towards night became delirious: the third was a distressing day, with much delirium: the fourth was a very restless day, and the night was passed, without sleep, in terror, delirium, and agitating dreams: on the fifth morning, he recovered his senses; but by mid-day, he became once more delirious and furious, his extremities became cold and livid, and by sun-setting he expired convulsed and perspiring profusely *." You will read with interest many of the other cases of Hippocrates, especially that of the young man, (liber. iv. lin. 85.) "who fell into this phrenitic

* Erasinum, qui habitabat circa Bootae torrentem, febris vehemens corripuit post coenam, nocte turbatus fuit, diem primam quiete, noctem laboriose transegit. Secunda omnia exacerbata sunt, ad noctem deliravit. Tertia dolorose, multum deliravit. Quarta molestissime, ad noctem nihil dormivit. Insomnia, et ratiocinationes, deinde pejora, et magna, et periculosa, timor, molestia. Quinta mane resipiscebat, ac intelligebat omnia. Verum ad meridiem multum insaniit, continere se non potuit. Extremitates frigidae sublividae. Urinae inconcoctae. Circa solis occasum mortuus est. Huic febres perpetuo cum sudore, praecordia sublimia, distentio cum dolore. Urinae nigrae habentes quaedam in medio suspensa innatantia rotunda, non subsidebant. Ab alvo stercora prodibant. Sitis perpetuo non valde. Convulsiones multae cum sudore circa mortem.

state. "It was, I believe, (says Hippocrates), about the eighth day that he burst out of bed in a furious condition, struck and struggled with great strength, and spoke obscenely, though naturally modest: he fell into a profound sleep, and a critical sweat on the tenth day; but he became again delirious, and died early on the eleventh day, in consequence, I doubt not, of his having drank wine freely before the phrenzy came on *." " Case iv. liber iii. " A phrenitic patient vomited copiously the first day a green matter: the fever was dreadful, accompanied with profuse, universal, continual sweating: the head and neck were oppressed with pain: he passed much faeces: he was sleepless and very delirious: on the third morning, his voice failed, the fever raged, he perspired without intermission, he had subsultus tendinum (palpitationes per totum corpus,) and was convulsed during the night, on the third was worse in all respects, and expired on the fourth." One thus diligent and zealous in the duties of his profession, so industrious in treasuring up knowledge, was well entitled to speak of study with boldness and confidence; it was most natural for Hippocrates to recommend and enforce by precept, what he so well taught by example, and to make that memorable distinction betwixt " *knowledge* and *conceit*, the former of which is wisdom, the latter foolishness." " Duo enim sunt, *scientia* et *opinio* quarum altera quidem scire facit, altera vero ignorare †."

* Qui primus delatus est adolescens, huic urina pura tenuis. Omnium secessus tenuis, multus, sine bile, lingua valde aspera. Febris adurens, insomnis, alvus gibbosa. Hic mente motus est, octava arbitror die, protervum in modum, exurgebat, pugnabat, turpia fortiter loquebatur, quum talis non esset. Huic quum urinae multae tenues prodiissent ex suppressione, somnus obortus est continuus, et sudor, qui judicatorius esse putabatur, ex quo talis erat forte circa decimam diem. Verum postea rursus insaniit, et brevi mortuus est undecima die. Occasionem fuisse puto, quod meracum multum bibisset, priusquam insaniret. Paucos habebat annos, propemodum viginti. Eumenis uxor autumno vomuit bilem atram. Sed et odores manifesti erant, et febres horridae, et cordis, sive osculi ventris dolores, biliosa pauca vomebat, et lumbricum.

† Lex. l. 31. The whole of his observations on the culture and duties of our profession, especially his remarks on natural genius, on discipline, on early industry, and the breathing as it were an atmosphere of knowledge, (a sentiment introduced by Burke into the discourses composed for Sir Joshua Reynolds,) are in the best and chastest stile of eastern metaphor.

Si vero natura ad optima viam demonstret, artis Doctrina facile contingit, quam sane cum prudentia sibi comparare oportet, ita ut a puero institutio accedat, atque id in Loco a natura ad disciplinam apto. Amplius autem et Industriam adhibere oportet: eamque ad multum omnino tempus, quo disciplina ipsa insita, feliciter, et cum profectu fructus suos producat. Qualis enim eorum, quae terra producit, consideratio est, ejusmodi etiam disciplinae Medicinae per omnia similiter existit. Natura enim nostra velut ager est, dogmata praeceptorum velut semina sunt. Institutio a puero cum eo con-

Of CEPHALALGIC PHRENITIS, or Phrenzy, in which pain is the first and most conspicuous symptom. The pain precedes the fever: the disease appears in the young, athletic, and vigorous: the paroxysm rises gradually to its achme: the phrenzy is so violent as almost to vindicate the figurative language of Willis, who distinguishes phrenzy from delirium by saying, "Let us now mount from the description of simple delirium, which is a perturbed state of the animal spirits similar to that which is occasioned in water by a stone cast into a still lake, to that of phrenzy, which is liker the torrents and tides of rivers and the sea, so great is the commotion*. The principal characters of the cephalalgic phrenitis are, the constitution which predisposes to it, the intensity of the headache, the violence of the phrenzy, the deep stupor which ensues, the sudden and invariably fatal termination of the disease, and the state of the brain which is usually livid and gangrenous; and this is never to be forgotten, that it has the peculiar inseparable character expressed in the best definition of Phrenitis, (Delirium a Cephalalgia atroci ut plurimum incipiens,) delirium usually accompanied with fever arising from savage pain in the head." First, the patient is struck with headache, accompanied with heat over all the head, throbbing of the temples, protuberant eyes, and a pulsation so violent that, holding the head between the hands, you feel it jarred and shaken at every stroke of the arteries, but with a visage pale, wild, and haggard, from extreme pain. It is remarkable that, according to the character drawn by Hippocrates, the pain shoots from the occiput along the spine, and the patient, even before the headache ripens to perfect delirium, lies in a state of stupor †: It is from this stupor, that he is roused into a delirium accompanied with demoniac-like struggles and shocking cries, till the whole body is bedewed with perspiration, the hair seems to stand on end, the face is haggard and yellow, the nostrils dilated, the lips quivering, and the hands trembling and grasping, even when the patient is most quiet. But in that inflam-

venit, quod opportuno tempore semina in arvum cadere oportet. *Locus autem, in quo disciplina contingit, est velut ambiens aer, a quo e terra nascentibus numimentum accedit.* Industria autem cultura est. Tempus postremum haec omnia corroborat, ut perfecte enutriantur.

* His ita praemissis circa primum, et levissimum desipientiae modum, ad gradum ejus altiorem, sc. phrenitidem, quae priori affectu longè major, et durabilior est, ascendamus. In delirio, spirituum cerebri incolarum perturbatio, velut aquarum in fluvio à lapide injecto undulatio excitata, verum in phrenesi illorum commotio, quasi fluctuum à turbine insanientium aestus videtur.

† Invadente affectu, ingens capitis dolor aegrum adoritur, qui per occiput, collo, et spinae communicatur; cui mox succedit sensuum omnium tum externorum tum internorum abolitio sicut in apoplexia contigit.

mation of the brain which is to end in sphacelus, he has no rest, he neither slumbers nor sleeps, till he falls into that fatal stupor which is sometimes interrupted by renewed struggles, but always ends in cold extremities, insensible evacuations, and a tremulous pulse: finally, it is conspicuous that the delirium takes its character from the headache, is wild and savage through excess of pain, the patient tears his hair, and lacerates his face with his nails, and where the phrenzy proceeds from fracture of the scull, especially where there is a fungus or protrusion of the brain, he tears off the dressings, and clutches the fungus in his crooked fingers, so as often to tear it up by the root, before the attendants are aware, or to cause great and fatal haemorrhages.

I remember in Riverius an example, communicated by Rufus, of this disease beginning in inflamed headache, and ending in sphacelus of the brain, which will serve excellently well to exemplify whatever I may have omitted in this description: "De Larthaudier a young noblemen, of 37 years of age, was seized during the dog-days with a most acute and dreadful headache, extending principally over the occiput and left side of the head, with slight fever, entire and vigorous senses, but intolerable thirst and unremitting watchfulness: The forehead was not heated; the rest of the head but little so: pressure on the head, though violent, gave him no pain; but, while holding his head betwixt your hands by the forehead and occiput, you might perceive it to be jarred and shaken by the violent pulsations of the arteries, so that the whole head had a pulsatory motion." We find here distinctly expressed, in this first part of this narrative, all the essential signs of idiopathic inflammation in the brain. The next paragraph explains the decisive and prudent measure taken by Rufus to prevent its rising to any fatal excess.

"Fearing Erysipelas, (says Rufus), or an abscess in the brain, we proceeded instantly to take away two pounds of blood, bleeding our patient first in the cephalic, and then in the median vein. During the ensuing days, the pain continuing excruciating, we took, at separate times, two pounds of blood from the opposite arm, and, on the fifth, we administered purges: on the 6th, we applied cupping glasses to the shoulders, by which we discharged half a pound of blood: the head was shaved, and cold vinegar and water poured over it, nor the slightest thing being omitted which might serve, according to our apprehensions, to appease the inflammation of the brain.

"It was on the 4th day, that a carcinomatous looking tubercle, hard and hollow, appeared on one side of the tongue: on the 7th, the patient was high-

ly delirious, the sweat broke on his forehead, and soon after distilled from every pore of his body, so that we flattered ourselves with the hopes of a perfect crisis: he was wiped and dried; the linens were changed; the sweat broke out again: he now began to complain of the bed-clothes being oppressive to him; he cried out that he was suffocating. Having upon this stripped him, and wiped him anew, we found him almost paralytic, and continually delirious: his strength, which before this exhausting perspiration was very entire, was now quite gone: he lay all night, (the 8th of his disorder), till nine in the morning, apparently exhausted, in a state of idiotism, muttering incessantly, and talking confusedly of every thing. On the 10th, he seemed to revive; and we might have been seduced into false hopes of his recovery but for the tremulous pulse and convulsed members which shewed the brain to be fatally affected. The urine now flowed freely, and was of a flame colour; but towards evening, and on the very same hour with the attack of the preceding day, the delirium returned, and so much the more furious in proportion to the degree of strength he had recovered during the intermission: he was furious and powerful, so as to terrify his attendants, and put them to flight. About nine in the morning, he fell low again, and continued so till evening, when a boil rose on his neck to the size of an apple, but neither painful nor discoloured. Still the delirium continued with convulsive motions of the arms; on the 10th day, every thing bore the same aspect; on the 11th, he expired in convulsions." Hippocrates says, in his Prognostic, "Quibus cerebrum sphacelatum est in tribus diebus pereunt;" but we see them sometimes, as in the present instance, survive to the tenth or twelfth day.

"So unusual and violent a death was a motive with his noble family (to whom the disease was particularly interesting) for permitting his body to be opened. Every thing was sound, except the brain: Upon raising the scull-cap, much black and fluid blood flowed out; it began to flow even before the scull-cap was raised the breadth of the blade of the saw, and the quantity disgorged from betwixt the scull and dura mater (for the membranes were still entire) was estimated at two pounds. The membranes being now cut, the veins of the brain were seen universally dilated with dark coloured blood; but in the back part of the brain and towards the occiput, and about the place of the Torcular Hierophyli, there was a space, of two inches broad and four long, black as a coal, apparently gangrenous, and, the scalpel being struck into this part of the brain, there flowed out from five to six ounces of very foetid pus; and, in the process of the dissection, this gangrene was found to extend over all the basis of the brain, and especially over the cerebellum, and that part of the

medulla oblongata which lies within the ring of the vertebra atlas, the precise point at which the outward tumour appeared; but, on the left side, the membranes of the brain were eroded, whence it is most probable the blood inundating the brain in general had flowed."

To these descriptions and this admirable example of the disease, I can have nothing to add, unless it be that, in this instance, the cause of such horrible phrenzy and gangrene of the brain was, that this nobleman, naturally of a hot and bilious complexion, in the flower of his age, and in full health and strength, had plunged into the river, after being exposed to the heat of the meridian sun, a cause from which many of our fatal brain fevers arise.

Of the MANIACAL PHRENITIS, or Phrenzy resembling Mania, in which there is no symptom of fever, no complaint of pain, no sign of inflammation, but sudden uncontroulable phrenzy: where the disease of the brain seems to arise merely from distracting thoughts, disorderly passions, from resentment sometimes, but chiefly from fear or shame.—I have remarked it chiefly in those of a sallow and melancholic temperament, whose brain has been inflamed by deep, abstruse, long protracted studies, by violent political altercations, or by family quarrels: I have known it arise from the disgrace of having refused a challenge, from the fear of political degradation, from the contentions of an election; from the violence of debates in public meetings, and the agitated feelings with which a man of strong passions has retired into his own family. No pain precedes, no fever accompanies this state of the intellect; there is at first more of imbecility than phrenzy; the patient is suddenly seized with a sort of fatuity, huddles up the letters or papers with which he has been distracting his imagination, wanders in solitude from room to room: his visage is pale and grim, and his eyes inflamed: he talks wildly and incoherently, sometimes laughs in your face sillily, sometimes grins: he puts off and on his clothes; is in and out of bed often in the course of a few minutes, without apparent design: when you think him beginning to be composed, you find his delirium, (in the space of the few hours that pass in this state of disorder,) concentrating into fury; he grins, spits, fixes his features, and extends his hands; sets himself up in bed in postures as if stiffened with convulsion; stares stedfastly in your face, as if with design to alarm you; and grins like a fiend, with such horribly distorted features as you sometimes seem to have before you in a perturbed and feverish dream: then comes on, and in a very few hours from the first attack, a wild and frantic delirium; the patient foams at the mouth, while the body is dissolved in sweat from the violence of his struggles: You now find

that no intreaties nor commands can engage him to lie a moment still, or stop the fury of his struggles; you cannot restrain his motions by any force which is not in danger of hurting him, except by wrapping him in the twilt, or putting on the strait waist-coat: when restrained from striking he kicks; when you hold his hands and legs, he rolls his head incessantly from side to side, and sputters out the foam, gnashing and grinding his teeth; his cries are very distracting, and in a shrill and piercing tone of voice; when he drinks, he drinks greedily and promiscuously whatever is presented to him, and often bites the cup: the features are pale, or yellow, and ghastly, the hair standing on end with sweat and struggling, the limbs trembling when not struggling, the hands shaking when not grasping, the lips convulsed, the nostrils dilated, the neck stiffened by a rigid contraction of all its muscles, and the platisma-myoides, especially from its contracted state, gives the neck a skinny form, and draws down the moveable features, especially the corners of the lips; the eyes are protruded, and in perpetual motion, the pulse in a continual quiver, till at last the body, bathed in profuse sweats, becomes cold and clammy, the faeces and urine pass involuntarily, the patient only mutters, becomes paralytic, and expires on the third day. It is difficult to prevent the patient injuring himself, so violent and unceasing are his struggles, and impossible to prevent his lying in the most loathsome condition, for while all the assistants are employed, (and all the friends who can endure such a scene,) in resisting his struggles, the faeces and urine are continually flowing into the bed: you change his linens and bed incessantly, but in vain, from the perspiration and ordure, and the spilling of whatever drinks or medicines are given him.

Here you perceive the strong distinctions betwixt phrenzy, or the violent delirium of an inflamed brain, and madness, (a subject which my present limits, I speak it with regret, will not enable me to discuss); for here there are no suspicions, jealousies, resentments, passions, no mark of perverted reason, nothing but unrespective fury, cries, and struggles, without meaning or design, the reason quite overturned from the first moment of the disease.

So true is it that, "the disease being known, the cure is easily discovered," that I do not feel it to be at all a duty to speak pointedly to this, or to say more than that the febrile and cephalalgic delirium require profuse bleedings incessantly repeated, sickening emetics, severe and drastic purges, nitre and cooling drinks, the

application of cold solutions to the head *, and the pediluvium or tepid bath : that in this disease, which I have last described, in this maniacal phrenzy, where there is no headache, no fever, and only a quick and quivering pulse, I think I have stopped its course, by subduing the strength entirely, by severe sickening doses of antimony, such as would poison one in health, and then giving opium, which I confess I am yet averse from using in diseases of the brain.

Of VOMICA CEREBRI, or Imposthume of the Brain.—You must have observed that, in some of the diseases lately described, part of the brain had suppurated, while much of it was actually in a state of gangrene ; but such general suppuration of the brain, though certainly worthy of being described, is comparatively rare. There is a description of this combination of suppuration and gangrene, proceeding from rapid and intense inflammation, and accompanied with phrenzy and fever, which I think it will be acceptable that I transcribe for you ; it is short, comprehensive, and very accurately descriptive of the usual tendency of this disease ; it occurred to Mr Bailly, a celebrated surgeon of Geneva, who " having gone to Tholouse to visit the Prior of a college for the education of young noblemen, (one whom he had formerly cut for the stone), there was brought to him a rich farmer of the neighbourhood, named Claud Bertrand, forty-two years of age, who first complained of intolerable pain seated in the forehead, a little towards the right side, and under

* Whether the cold ablutions may be carried farther, my readers may judge from the following narration of a case, in which a stout servant girl did, in the literal sense of the word, swim for her life.

Olim ad Ancillam robustam, quae febricitans, et summè insaniens, continue in lecto vincta tenebatur, curandam accersebar. Huic sanguinem copiose, et dein iterato mitti, alvum ab enemate crebro subduci, quin et alias quasque administrationes, in hoc casu usitatas ordine celebrandas praecepi ; interim julàpia, emulsiones, et hypnotica propinari : Verum his parum aut nihil juvantibus, per septem, vel octo dies illa insomnis usque, et furiosa admodum perstitit, potum frigidum ejulando, et clamando perpetuo exposcens ; quapropter hydropotia, ad libitum immo ad satietatem concessâ, nequaquam sedatior, aut sitibunda minus facta est ; itaque (si quidem tempus aestivum fuit) ut media nocte a mulieribus sublata, et foras perducta Cymbae imponeretur, dein vestibus exuta et vinculis soluta fluvio profundo immergeretur, fune tantum circa corporis truncum, ne forte submersa interiret alligato ; verum istiusmodi, retinaculo nihil opus fuit, namque puella ut vix melius vir quispiam artem hanc probè edoctus, sponte natabat : post tertiam, aut quartam horae partem, sana, et sobria aquis eximitur, dein lecto commissa dormivit, et copiose sudavit, posteaque sine alio quovis remedio convaluit. Curatio haec tam subito, feliciter successit, in quantum flamma tum vitalis, tum animalis simul immensum auctae excessus, a proprio ignis intensioris remedio, sc. humectatione, et infrigidatione ab aquis tollerentur. *Willis*, p. 238.

the coronal suture, which he ascribed to being exposed to the heat of mid-day in a light thin cap: the sun beat long and violently on his head, and he passed the succeeding night in the open air; next morning he was seized with his disorder, which began with a gravitating pain within his head, a burning fever, nausea, rigors, watching, and extreme anxieties, with eyes fiery, red, and blood-shot: phrenzy came on the 5th day, and the physicians of Tholouse prescribed the usual remedies, but he expired on the 9th day; and a foetid pus having distilled from his mouth, nose, and ears, especially his right ear, the friends allowed his head to be opened.

" Upon raising the scull cap, there appeared an abscess, of the size of a walnut, which, being opened, poured out a greenish and extremely foetid pus, while both dura and pia mater were touched with gangrene."

This is not vomica or abscess, but a diffused suppuration mixed with gangrene, brought on by universal inflammation of the brain: Vomica is an encysted abscess, which, though equally fatal, differs altogether in its signs and consequences; it is local; it is marked by pain so limited, that the patient can cover with the point of the finger the part diseased: it is accompanied with delirious headaches, but though the pain never entirely ceases, the paroxysm recurs at great intervals of time; and when the abscess extends, and trembling or convulsive motions follow, when at last, in some more violent paroxysm, the inflammation extends over the whole brain and proves fatal, stupor precedes death; and, upon dissection, the brain and its cavities are found suffused with serum, and the Vomica, like abscess in other parts, is surrounded by a firm and circumscribed sac. Such is the disease, which perhaps I should describe more accurately, before I either pretend to ascertain the nature of the abscess, or venture to guess at its cause.

When a man in full health and vigour is struck not with headache, but with acute intolerable pain within the cranium, fixed to one spot, and such pain returns from week to week with aggravated violence; or when a delicate woman, not unaccustomed to headache, has a poignant intolerable pain under one parietal bone, or in the occiput, so circumscribed that she can cover the pained part with the finger; when the general headaches seem to arise from this more local pain and giddiness, langour, and fits of fever, with slight shivering, accompanying each paroyysm; when at times the patient throws herself down in agonies flat upon her bed, holds the head firm betwixt her hands, or requests her

friends to press it with all their strength; when, after such pain raging for some hours, there comes on giddiness and confusion of head and delirium; when distracted and wild with suffering, and no longer conscious of what she does, tears her face and her hair; when after weeks or months of suffering, she becomes so much impressed with the belief of something forming within her head, as to intreat to have it opened with instruments, there is every reason to fear that she is not mistaken that a fatal abscess is actually formed in the brain. Yet after months of melancholy suffering, and even when death is approaching, the reason is entire! then every attempt to walk is followed by sickness and staggering vertigo: she begins to wet the bed: paralytic weakness and slightly convulsive tremors affect her limbs, a stupor follows, and she expires placidly, or but slightly convulsed.

Upon opening the head of one who has died of this disorder, there is found, along with a general enlargement of the ventricles and effusion of serum, a circumscribed and regular abscess involved in a thick and firm sac. It is because the abscess is thus sacculated that its progress is so slow, the health so gradually ruined, the reason so slightly affected; the occasional paroxysms of pain and slight delirium mark the several accessions of inflammation and successive enlargements of the abscess, and it is by propagating the inflammation over all the brain, that it is in the end fatal.

But how such local abscess should form in the brain where no glands subject to such diseases are known to exist, where no extravasation of blood, such as causes abscess in other parts and organs of the body, can take place without producing instant death and palsy, in an organ, too, where apparently no outward injury can reach the part, is indeed difficult to conceive. Nor is it less wonderful, that, seated within the delicate substance of the brain, such abscess should continue circumscribed, grow slowly, encroach upon the brain and waste its substance, yet hardly affect the faculties of the mind: that it should form for itself, out of the delicate cellular substance of the brain, a sac as thick, firm, and regular, as if it were seated in the thigh: Yet these are indisputably the circumstances in which this vomica cerebri, or circumscribed abscess of the brain, are always found; and were I to relate to you a hundred instances of this disease, each narrative would conspire to prove one or more of these circumstances.

I must now prove to you, by probable inferences, that such abscess does actually arise from some slight rupture among the vessels of the brain; for which end, I shall proceed to analyse a case, a most interesting one: it is not, indeed, so sur-

prising that those having, from rupture of the smaller vessels, slight lacerations in the substance of the brain, should have small abscess formed around the extravasated blood, as that those struck with palsy (assuredly proceeding from bloody extravasation) should escape them.

" The subject of the following disease was one who had lived a regular life and enjoyed perfect health, till in his fortieth year he was afflicted with many misfortunes in trade and in his family, for he was an artizan and not opulent. Thus, he became melancholy, and having consulted a low and ignorant person, he ordered him a strong antimontial emetic; after which, having taken copious draughts of cold water, and exposed himself at the same time to cold air, he suddenly fell down to the ground in an epileptic fit; and when he recovered from this convulsion, he was affected with such irritability of the left arm and hand, and with such an exquisite sensibility of the surface, that even the slightest breath of cold air upon the parts brought on convulsive twitches not only in the arm, but in the muscles of the mouth and face, and, indeed, over all the head; and on any remarkable change of the atmosphere, or even by the natural variation of the seasons, and especially by any violent passion, he was so affected as to fall down in fits of proper epilepsy.

" Such was his distressed situation during four years; and all the while he complained of an obtuse and heavy pain, in the left side of the head, under the parietal bone. This pain varied in its degree of violence, sometimes it was absent altogether, returning occasionally in paroxysms more or less excruciating; and the patient, while he marked the place of the brain occupied by this pain, expressly declared it limited to a space no bigger than an egg."

" During the last year of his life, he had the haemorrhoidal flux in a remarkable degree, and during the four years of suffering he had tried the prescription of various physicians: an issue was made in the affected arm, and, that being healed, a seton was made in the neck, and during the last year a seton was also kept open in the affected arm, and every morning and evening it was dry rubbed with rough cloths impregnated with the gums of mastich, olibanum, amber, camphor, &c. and anointed, after each rubbing, with various spirituous oils and liniments, while various purging, nervous and aromatic medicines were given in every variety of combination, but without the slightest advantage."

" Wearied with ineffectual endeavours to regain his health, and anxious to leave nothing undone, he requested most earnestly to have those mineral waters given him which he had heard and read of as so useful in such complaints. He had used

seven bottles of an acidulated mineral water, but the only effect was loosening his belly; and, on the last day in which he used those waters, he had an evacuation of a small quantity of clear mucus, such as old writers have chosen to name "pituita vitrea;" his appetite, which had almost vanished, was now restored."

"Next day, while taking, by separate doses, the eighth bottle of this water, he was seized with vomiting: the water being rejected, beef tea was next tried, the second draught of which he also vomited; and now the pain, which he had felt all along under the right parietal bone, was greatly increased; it became intolerable; and the ointment of axunge and balsam of rue, from which he was wont to have relief, was tried in vain: this excruciating pain continually increasing, a bread poultice was next applied, with juniper berries and a little common salt; but next day he fell into a complete stupor, and while he was taking a nervous medicine of castor, amber, &c. he expired before he had taken much of it."

"The liver was more crammed with blood than usual, the abdominal veins, especially those of the stomach, were very turgid, but the viscera, being otherwise sound, we turned next (says Baader) to examine the head; and there, upon removing the scull-cap and membranes of the brain, we found in that part where, during life, he had marked the seat of his pain, both the cineritious and medullary substance of the brain greatly harder than natural and truly schirrous; and underneath this indurated part of the brain, which the patient had so often marked with his finger, was an abscess the size of an egg, its cavity filled with a granulated and yellowish mucus matter, it was encircled, and its basis formed of a substance livid and reddish, painted with delicate vessels in a state of inflammation *".

The points of proof in this case are very conspicuous: first, a man arrives, through a troubled and melancholy life, at a period in which we are most subject

* This case was taken in the Poors-house of Vienna where the head was dissected. The following are the original notes of the dissection; the above is a close and servile translation of the case.

Remoto segmento cranii, ablatis integumentis cerebri interioribus, in illa cerebri plaga, in qua durante vita aeger de dolore conquaestus est, substantia corticalis cum vicina medullari solito multum durior ac vere schirrosa deprehensa est.

Infra hunc locum induratum, quem defunctus saepissime digito monstravit, abscessus latius ori gallinacei magnitudine.

Cavum hujus apostematis replevit materia flava, granulosa, mollis, mucosa; fundum ejusdem occupavit, et investiit, substantia ex rubro livida, in qua vascula subtilissima inflammata apparuere.—*Baader, page* 113.

to palsy, the fortieth year; and then, after a strong antimonial emetic imprudently given, he falls down epileptic, and when he revives, has paralytic and convulsive tremors of the left arm, and twitches of the face and mouth demonstrating the slighter degree of palsy. Secondly, he has from that moment, and during the four succeeding years, along with these slighter signs of palsy, a continual obtuse gravitating pain, and this dull obtuse pain is interchanged with occasional paroxysms of intense and acute pain, with a constant persuasion that he can point out the express seat of the disease, and that it occupies a space equal to the size of an egg. Thirdly, the physicians continue fumigating, rubbing, and fomenting the arm, tormenting, with issues, a part where, though the signs of the general disorder appear, the disease never could have its seat. Fourthly, his approaching death is announced by vomiting and stupor, intolerable and raging pain, the abscess had subsisted four years without affecting the faculties, till now that the inflammation suddenly extends over all the brain. Fifthly, the substance of the brain is found in this dissection to be subject to the same changes with other parts of the animal body: the size of the abscess (large as the biggest hen's egg) the schirrous firmness of all the surrounding substance of the brain, the thick, solid, and fleshy firmness of the tunics surrounding this vomica, for so I think we may translate "substantia investiens ex rubro livida;" and, finally, the state of the secretion within this abscess, not pus recent or immature, but viscid mucus, and granulated, as matter always is when long inclosed in a sac, and exposed to continual secretion and absorption: and, finally, the walls of this cavity, being covered with conspicuous blood vessels, show how long and how powerful the vascular action had prevailed, and by how many successive paroxysms of inflammation this disease had been brought to maturity.

These are conclusions so very important, that it is almost a point of duty to confirm them by other facts; and without detaining you to hear a long and desultory narrative, I will lay before you the analysis of another case: it is not one of the class of wonderful and extraordinary cases; it has in it nothing difficult to believe, nor out of the daily course of practice; it is interesting for the truth and simplicity of the narrative, and for the interesting conclusions which arise out of the most simple facts *.

* While I deliver the analysis, I cannot think myself entitled to withhold the narrative, which I have translated correctly and literally.

"Ursula Aberling, unmarried, and twenty-three years of age, was one day carrying a bulky and very heavy load of grass from the fields, *when she felt as if something within the head had given*

"A young and hardy woman, in the prime of life, inured to the coarse and laborious occupations of a farm, while carrying a load of grass upon her head, felt all at

way: Soon after this, while carrying dinner to the reapers, with plates, &c. upon her head, up to the higher grounds, she felt herself so oppressed with the weight that she almost sunk under it, but there was no one to help her: she struggled up the hill with her load, *and then she again felt something give way within.* From that hour she was sensible that she could not retain her urine the usual time, yet she continued her labours as usual: a churlish father held her to her work, which she performed without complaining, her menstruation continuing regular. On the 22d of December 1667, without fearing any ill symptom, she walked so fast to church that she was greatly heated; and, being chilled by the coolness of the place, she instantly felt herself powerless in the left leg, dropped upon her knee, and was prevented by the person next her from falling forwards: she was struck powerless in all her left side: her mouth was distorted, and her lower jaw drawn towards the right side; and although at first she spoke intelligible, in a very little while she could not be understood: the by-standers, believing her to be in a faint, though her cheek still preserved its natural colour, sprinkled her with cold water. Being carried home paralytic of one side, she continued delirious for fourteen days, complained *of a raging pain in the back part of her head, as if the hair had been continually torn from the scalp, while the right eye was tortured as if it were continually torn out of its socket.* In her left side she was entirely paralytic, but, except the loss of power and sensibility, felt not the slightest uneasiness; during the first days, she passed urine frequently and in great quantities, yet without wetting the bed: she complained only of headache, nor had she any medicine, except, from an old woman, some cephalic waters. On the 7th of February, I was called to her at eight in the morning, on account of a paralytic stroke, when she appeared to me fleshy and well coloured: the distortion of the mouth was not great; she spoke freely and distinctly, nor did she complain much of pain in her head: her left arm, indeed, she could not move of her own accord, but, upon pressing the arm a little with the points of my fingers, she withdrew it a little; her left foot she could rest upon a little, but could not move it forwards; both the leg and arm of the left side quivered, from time to time, with a sort of convulsive tremor; she ate with moderate appetite, was well in all respects, and her menses flowed with the regularity of perfect health. I ordered decoctions of rosemary and other cephalic herbs, nervous liniments, occasional purges, and a suitable regimen. Having continued to follow these methods for some little time, she gradually recovered strength in the left leg, and during all the summer crept abroad upon a stilt, and frequented the church; *but her headaches soon returned, and were aggravated by wine,* wherefore she continued during *the whole summer to drink water or goats whey, and always she preferred what was cooling to any thing warm, so that she lived upon milk, acids, unripe fruits, &c.* and often through the whole day ate nothing but a slight breakfast. One morning in the month of August 1668, when rising from bed, she felt languid and powerless, and complained of pain in the soles of her feet, which, though apparently sound, were so tender that she could never after stand upon her naked feet. After this the pain, especially in the right side of the head, returned; now it was in the occiput, now in the forehead, now in the temple, now in the top of the head; it was most excruciating: she cried out that there was a gathering, a beeling, in the top of her head just

once as if something had given way within. Soon after, in toiling up hill in a sultry day in autumn, her head loaded with plates, utensils, and a dinner for the reapers, the whole body straining, the head and neck loaded, the circulation of the brain accelerated, she again felt that something within the head had given way.

From that hour she was sensible that she could no longer retain her urine as heretofore: she continued, though enfeebled, to work, because compelled to do so by a churlish father.

Again, in walking to church very fast, flushed and heated, and suddenly exposed in so damp a place to the cold and chills, there happened, in consequence of the high arterial action, which this excited, an addition to the first extravasation: for she fell down powerless of the left side, dropped first upon her knee; was supported and prevented by those near her from falling; and, when raised and recovered from her faint condition, was found palsied in all the left side, with distortion of the face; and, with this third partial effusion, there came on a degree of inflammation, for she continued delirious for fourteen days, with a sense of pain so peculiar in the scalp and eye of the right side, that it seemed as if the hair were continually torn out, and the eye tortured and twisted out of its socket.

From this time, headache became a fixed and permanent ailment: of the palsy, she recovered slowly and imperfectly: she was conscious that wine hurt her head, and therefore lived on whey and fruits: she crawled slowly to church, and continued to trail the legs.

ready to burst, and begged that it might be opened; often she was seized with such giddiness that she believed herself falling, and felt the brain disordered chiefly in the right side: still she walked, but felt the paralytic arm so heavy that it seemed to draw her forward. When the winter advanced, partly from the abuse of cooling diet, from her sedentary life, and neglect of the proper medicines, she became aedaematous: her ancles swelled, and her belly became tumid: In January the menses first disappeared; rheums seized her chest; the cough was distressing; the breathing difficult: she often brought up little clots of blood; but, when the cold went off, she breathed freely, and lay down with ease, and slept with the head lower than those who are dropsical usually do. The dropsy increased, the belly swelled more and more, the loins became aedaematous, the right foot was grievously pained. On the 23d of March, I found her dying; the legs, arms, loins, and all parts, being completely dropsical: She had the Hippocratic face, cold extremities, a clammy tongue, a pulse extremely feeble; in the lower extremities livid spots appeared, and the right leg was threatened with gangrene: for some days she was delirious, but became sensible towards the approach of death, and her sight and hearing ware perfect even to her last breath.

One morning, at the distance of a year from her first feelings of something giving way within the head, she seems to have awaked with the sense of having suffered a slight paralytic stroke, or at least with feelings of particular feebleness and languor; and, from this period, was afflicted not with headache only, for that implies a general disorder, but with pain of the head apparently fluctuating from the occiput to the forehead, limited to the right side: she also cried out with agony, and was conscious of a suppuration, and besought them to open the part: she was affected with excruciating pain, and was almost delirious; she was so giddy, that she continually imagined herself falling down, yet her weakness increased but very gradually: she wasted slowly, was, towards the end of her trouble, delirious for a few days, but recovered her senses before death.

You will easily distinguish (the cause of her illness, and the manner of her death being considered) betwixt the horrible symptoms produced by a brain universally inflamed, and by a local disorder such as this; for there was found in the right ventricle, within the bounds of that cavity, but involved in strong and peculiar coats, an abscess as large as an egg, while the brain was universally suffused with that

" On the 25th of March, we, by bribes and intreaties, obtained leave to dissect the body."

" The spots on the legs seemed to have grown broader and more livid; vesicles began to arise, and serum sweated through the pores of the skin; the abdomen was flattened, and a viscid and yellow mucous flowed from the mouth: a thin, ichorous, and uncoagulating blood distilled both from the vessels of the integuments, which were opened with a crucial incision, and from those of the scull itself. Upon lifting the scull-cap, a quantity of serum covered the dura mater; the falx being cut away from the crista galli, and turned back, the whole surface of the brain appeared covered with a transparent yellow jelly, which filled up the convolutions, and gave an evenness to the whole surface. The pia mater being opened, a profusion of thin and yellow serum flowed out; and the brain being cut to the level of the right ventricle, instantly a turbid serum burst from it; and in this much dilated ventricle there was an abscess, as large as a hen's egg, inclosed within its proper coats, of considerable thickness, (peculiari tunica crassitiae pennae collumbinae vestitis), one end of the abscess stretching outwards towards the temple. The sac being opened, a turbid and yellowish serum flowed out, which being evacuated, the substance of the brain, at the sides and bottom of the sac, seemed corroded and ulcerated; for, the mucous being cleaned out from the floor of this cavity, the little knobules of the brain stood out prominent and ragged: in this sac no opening could be found, neither by pressing before, nor by searching after it was opened: Both in the left ventricle and in the right, I found serum, but in small quantity, and more limpid; whence I conclude, that in *the right there had been two follicules, one of which had been* inadvertently opened. Upon taking away the brain and cerebellum, and cutting the spinal marrow, much serum flowed upwards through the occipital hole."

serum which always exudes from inflamed surfaces, and which, in this instance, burst out at every new incision, from the act of raising the cranium, to the incision into the ventricles; serum inundated all the surfaces of the dura mater, pia mater, and cavities of the brain, while a transparent yellow jelly filled the cellular substance of the pia mater, and levelled all the convolutions of the brain.

Of VOMICA HYPOCRANICA.—As the abscess generated within the substance of the brain is distinguished by the name of Vomica Cerebri, that which is exterior to the brain, hardly more accessible to the surgeon, or less fatal, is distinguished by the name of Vomica Hypocranica; Vomica as expressing the sacculated form of the abscess, and Hypocranica as implying that it is found under the cranium on the surface of the dura mater, and such abscess has been universally imputed by the above writers to extravasated blood. Their doctrine of the cause of Vomica, you may easily believe, I am little inclined to dispute; it was indeed founded on observation. Often Pathologists, when in the first instance they had reason, from the circumstance of a blow or a stroke, to believe that blood was extravasated, found, in the second instance, a collection of pus, and they were ever ready to account for every phenomenon, and especially for this conversion of blood into pus, which they ascribed to heat, stagnation, and putridity. The absurdity of their theory does not deter me from approving the truth of their observation: this opinion of the conversion of blood into pus is copied from Hippocrates, who says, "Sanguis quinque aut sex mensibus in utero immoratus, ibique putrescens, in pus vertitur, quod quibusdam per pudendum extra fertur:" upon such hints, the commentators never failed to improve: the circumstances of the menstrual blood, thus detained within the womb, were again enumerated as equally natural to blood stagnating under the scull, or in the sinuses of the brain. "The blood stagnating in these canals, heated beyond measure, mixed with corrupting phlegm, wanting too the benefit of ventilation through the sutures, is at last (says these pathologists) converted into pus, and forms an abscess.* This is the sum of their theory of Vomica: the formation of the sac is accounted for by a more elaborate and learned theory, which is best, and perhaps first, laid down by the Dutch surgeon, Arn. Boot, who shews, that "whether the stagnant blood be extrava-

"* In horum ductum seu canalium (says Boot) restagnans sanguis, se plus justo calescat atque inflammetur, tandem in pus abit, atque abscessum constituit; but, that no circumstance might be unexplained, he adds, "Fit igitur haec inflammatio quando sanguis iste multa falsae pituitae admissione infectus, et plus quam par est calefactus amittit, eodem tempore beneficium *ventilationis* per compages suturarum, &c."

sated by a shock, or whether it merely lingers in its passage through the sinuses, Nature, to prevent the diffusion of the blood and purulent matter over the brain, weaves a web of cellular substance, cross-ways and long-ways, gluing thread to thread, till a sufficient, firm, dense sac is formed, just as the fecundating semen is, as soon as received into the uterus, involved in the necessary membranes; and in this sac is the blood changed, ripened, and converted into pus."*

In such vain theories there are often involved practical facts, which it becomes you to know; those implied in the present theory you should be careful to remember: Such abscess under the cranium, which was ascribed to the stagnation of blood in the angle of the great sinus, viz. at the corner of the temporal bone, is really more frequent at that point, because of the spongy nature of that piece of bone, because of the complicated and delicate organ of the ear which is seated there, and because of the frequency of scrophulous caries at this point. When such abscess is unexpectedly found, it is usually at the occipital angle of the temporal bone; and from such abscess many escape alive by the fortunate effusion of the pus from the abscess through the ear. This is especially frequent in delicate and scrophulous children, and sometimes in the adult, as in the case of a London citizen who had for six or seven years been afflicted with pains in the head, and, as he lived in a city abounding with medical practitioners, had gone through no small variety of prescriptions, without effect. Walking, one winter's day, in the streets, he was all at once relieved by an operation, (performed by an unknown hand) rather more fortunate than delicate; for he was hit so lucky a blow on the ear with a hard rolled snow-ball, that the matter of this long formed abscess instantly burst forth, and he long survived this fortunate blow in perfect health. But Vomica is a disease not un-

* Vomica Hypocrania—Est aliud inter cranium ac meningem abscessus genus in devexiori capitis *parte ad alterutrum latus, secus ossa petrosa, oriri suetum,* non ex sanguine cum alienis humoribus affatim permixto, uti illud modo explicatum, sed ex mero simpliciq; (qualis in venis continetur) *idq; inter cystin propriam,* cujusmodi abscessus peculiari nomine Vomicae appellantur. Origo illi ab externa violentia, validoq; capitis ictu aut illisione, unde rupta aliqua ex venulis Cranium vel Meningem perreptantibus, aut hanc illi alligantibus, sanguinem in intermedium spatium profundit: *cui solers natura confestim tenuia quaedam ex ipso fila deproperans, ac undiq; retis instar circumtendens, iisq; alia super aliis interserens, ac obliquis quoq; transversisq; fibris omnia intra se firmiter atque arcte ligans*; *eodem artificio, quo membranae in utero semini genitali statim a conceptu circundantur, parvo temporis spatio detexit firmum densumq; folliculum, intra quem conclusus cruor paulatim a statu suo demutatur, atq; in pus excoquitur.* Hic Abscessus, seu folliculus pure plenus, semper una in sede stabilis permanens, quum neq; evagandi spatium detur, ut qui emissis quoq; quibusdam filamentis vicinae Meningi alligetur.

frequently fatal* ; and, seeing that is so, we must be always watchful when that suppuration in the ear, by which so many children lose the hearing of one ear, is attended with outcries of pain, want of sleep, restlessness, tossing, fever, and continued headaches : then strong purges and opiates are to be given ; leeches to be applied behind the year ; a tepid solution of opium poured into it ; a large poultice, with camphorated oil, laid over the side of the head, and every thing done to prevent the extension of that inflammation and abscess to which we sometimes see delicate children fall victims.

That you may be fully aware of all the forms of inflammation in the head, of what is possible, as well as what is frequent, I shall close this subject with a narrative in which you will see the head affected like a limb with universal suppuration, external as well as internal ! the whole head suppurating at once, within and without, in the skin, and in the brain, in all its cavities, and all its cellulur substance. The case is related by Bursarius ; the dissection was performed before him, by Dalarenius and L. Benedictus, then his clinical clerks. " The case was that of a young woman, twenty five years of age, who, after being afflicted during fifteen days with dreadful pains of her head, requested his advice, for then her eyes began to be effected, her eye lids to

* " Elizabeth Erot, wife of a watch-maker of Leiden, twenty-three years of age, a very fair and delicate young woman, had from her infancy, from the time at least of her having the small-pox, a running from one ear, accompanied with a frequent severe disorder in the head. In the ninth month of her pregnancy, when this flux of matter from the ear was less than usual, she was attacked with dreadful pain, such as drove her almost delirious ; the pain was seated in the vertex, where she begged of her friends and attendants to press firm with the hand. The head was shaved, the scalp was fomented with warm milk, cleansing injections were thrown into the ear ; on the seventh day of this distress, Spon, being a second time called, found the pains greatly increased, with a tremulous and spasmodic affection of the arm ; next day, the labour pains came on, and in the evening she was delivered of a daughter, a healthy child. Then we were not without hopes, (says Spon), that the profuse flow of lochiae would carry off the disorder, and willingly left it to nature. But the excrutiating pains of the head increased in violence : the tremulous or convulsive motion of both arms increased : she had an injection ; a poultice of bread and milk was applied over the head, then the cataplasm of J. de Vego. But, the disorder still increasing, this excellent young woman died in a few days."

N. B Suppurations about the head are frequent in pregnancy : if ever a gland of the neck or jaws swell during labour, never expect to see it discussed ; it always suppurates.

" When lifting the scull-cap, both the coverings of the brain appeared much inflamed ; and, upon opening these, a great abscess of the brain appeared ; it had been inclosed in its particular sac ; its bursting abroad into the brain was the immediate cause of death : that portion of the temporal bone which projects into the basis of the cranium was very remarkably diseased ; it was still invested with its dura mater, but black and carious, so that upon the touch of the probe, it crumbled into powder."

swell, her whole face, but especially around the eyes and eye-lids, was puffed up into an immense tumor; the cheeks were also greatly inflamed, the redness disappearing for a moment upon pressing with the finger. The eyes then closed altogether; the fever increased with great anxieties and oppression; the cellular substance suppurated, and the matter burst out from the angle of the eye and through the prominent part of the cheek: the eyelids, being thus somewhat emptied, could be forced open to inspect the eyes, when the cornea was seen, as in chemosis, almost concealed in the projecting adnata, the adnata fleshy and red, the cornea itself clear, but the pupil dilated as in mydriasis, and the eye insensible: four days after the bursting of the abscess, came a universal convulsion; universal palsy succeeded; the respiration became stertorous, languid, and irregular, the pulse feeble, irregular, intermitting, and thus the young woman expired:—Upon dissection, the cellular substance of the eye-lids, cheeks, and face, down to the angle of the jaw, was found to be destroyed, and full of putrid pus: the globe of the eye was unhurt, the humours entire, the cornea somewhat opaque; the head being opened, it was found that the left hemisphere of the brain was wasted by suppuration, while the pus was lodged in a particular manner round the optic nerve of the palsied eye.

SECTION III.

But this disease is not thus fatal if either it burst spontaneously before the brain be deeply affected, or the part be trepanned so as to make a free passage for the matter. The following case from MORAND'S OPUSCLES DE CHIRUGIE is a proof how much may be accomplished by careful surgery:

"A MONK, living in the monastry of the order of St Bennet, in Bourbon, about fifty years of age, having been subject for some years to rheumatisms, was struck all at once with violent pains in the head, especially in the left ear, with stoundings and a noise as of the rushing of water. This disorder was accompanied with fever; and after a few days, a yellowish pus burst from the affected ear. Various remedies, as blisters upon the part, and injections into the affected ear, were used with advantage; only this was particularly remarked, that when the discharge stopped, the pain increased, and a caustic being applied, the pains became insupportable, with an intermitting fever and total loss of hearing in the affected ear. All kinds of remedies were tried in vain; the patient's sleep left him, and no posture gave any relief.

"Now, an abscess was observed behind the ear with a swelling along the temple. After applying such things as might promote the suppuration, the abscess was opened the third of September, about eight months after the first attack. Much pus was discharged; the patient was greatly relieved; but, as the suppuration was of great extent, Morand was obliged to make a second incision on the cheek just before the ear, which discharged a great quantity of matter. The second incision healed, the first remaining fistulous, and a sinus was found leading from that opening, upwards, along the temple; still the pains continued varying with the state of the weather.

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SECTION III.

CONSISTING OF DISCOURSES,

I. *On* FRACTURES *of the* SCULL, *with Solutions, Historical and Practical, of the important Question, whether Fractures of the Scull be a motive for applying the Trepan?*

II. *Of* DEPRESSIONS *of the* SCULL, *with a Solution of the Question, whether Depression affects the Brain? and whether Depression is any way a more urgent motive for applying the Trepan than simple undepressed Fracture? Accompanied with Examples, Drawings, and Plans of the Various Forms of Depression.*

III. *Of* CONCUSSION *of the* BRAIN *and* EXTRAVASATION *of* BLOOD: *The Signs of Danger, and the Rules for Operating.*

IV. *Universal Rules for the conduct of the Surgeon.*

V. *On the* OPERATION *of* TREPAN.

DISCOURSE I.

OF FRACTURES OF THE SCULL.

I will no longer revile the doctrines or inveigh against the practice of the ancients: suffice it to say, that the peculiar nature of their studies begot a passion for operating exceeding all bounds of good sense, propriety, or prudence: The little of anatomy they did know was that of the skeleton, and chiefly of the cranium: they were subtile in the arts of discovering, curious in distinguishing, and inexorable in trepanning fractures: they suffered not the slightest chink or cappillary fissure to escape investigation, and were never contented with what they had done, while they had

"This person having written letters of consultation to Paris, was advised that there might be a caries of the temporal bone, which should be more narrowly looked into; and he accordingly resolved on coming to the capital, where, upon his arrival in April, fourteen months after the first disorder, Morand found a

left any possible thing undone: they scraped and widened every fissure, trepanned every fracture, elevated every depression, were unsparing in their openings, whether made with or without a purpose: wherever blood was extravasated upon the dura mater, they continued to apply the trepan, making repeated openings into the cranium, until they had uncovered the whole coagulum: they scrupled not to apply

caries of the lower part of the temporal bone, wherefore I made an incision (says Mr Morand) to uncover the bone, left it to suppurate, and applied a mercurial solution to keep down the proud flesh: But, the fungus still growing over the bone, I resolved to use the cautery, which, after having applied frequently, procured, on the third day, a considerable exfoliation of the outer table; then I was in hopes, especially when the temporal bone began to cover itself with granulations, that the sore would heal, but it did not, and poured out on the contrary much more matter than the apparent surface of the fistula could any way account for."

"Upon searching again with the probe, I found still a long sinus running up the temple, (says Mr Morand): I felt no naked bone along this sinus: I hoped to heal it by injection: I threw in a little of the balsam of Fiorovanti: I naturally expected some pain; but what was my astonishment, when after suffering excruciating pains, the patient fell into a furious delirium of some duration. Neither irritation of the temporal muscles of the tendinous fibres, nor any external part, could account for such a phaenomenon; I of course concluded that the injection had some how or other reached the membranes of the brain, nor was I deceived; from this upward sinus another ran down towards the pars petrosa of the temporal bone, and by turning my bent probe in various directions, it entered at last a carious hole in the bone, and seemed to penetrate two inches within the scull. Now it was plain why all our former attempts were in vain. Upon consulting with Messrs Le Dran and Guerin, it was resolved, says Mr Morand, to make an incision in the form of the letter T. and to apply the trepan. The incision being made, and the bone laid bare, after suppuration was established, and on the seventh day after the incision, we applied the trepan; but before applying it, I resolved to decide the question, whether the bone was corrupted by an external abscess, or whether matter proceeding from a suppuration of the brain had made its way out through the hole. The latter opinion seemed the less probable, as the patient had been able, during all the disease, to walk abroad and discharge the duties of his ministry. But upon spiggoting up the small round hole on the temporal bone with a wooden plug, the matter, at next dressing, rushed with a whizzing noise through the hole. The trepan was so applied as to comprehend at least one half of this hole; and it happened, that twice after the perforation, I delayed dressing the opening for twenty-four hours, when, upon lifting the compresses, and withdrawing the syndons, the matter spouted out, as it had done before perforation, upon withdrawing the plug. By the fourth or fifth day, the pains began remarkably to decrease; the matter issued in less quantity; my probe passed through a small opening in the dura mater, penetrated a full inch into the brain, and as all along we had only a slight degree of fever to combat, I had sanguine hopes of curing this priest perfectly.

the trepan twelve or even twenty times, but boasted of it as the highest proof of dexterity: they never permitted even the lacerated teguments to reunite with the scull, but exfoliated every naked piece of bone, i. e. scraped it with instruments, or killed it with caustic, not without extreme danger to the brain. This is the rough and cruel surgery of which I plainly accuse them; nor can I entirely acquit the best and foremost of the moderns of like propensities: they also have contributed, by precept and by example, to take away all those decent restraints which should weigh upon the mind of a young man entering into practice: they have

"But I was sensible that in order to accomplish this, it was necessary to dress the ulcer in the brain. I, for this end, introduced a twist of the thickest catgut, held by a small thread, which swelling from dressing to dressing, enlarged the opening in the ulcer of the brain. By the 7th day of this kind of dressing, I could introduce this lint to the depth of two inches; and every time that I withdrew it, there issued from the brain a profusion of pus, which flowed more rapidly when I made the patient cough or retain his breath. This dressing was continued to the 14th day, when I found it necessary to enlarge this opening, by making a crucial incision in the membranes of the brain, opposite to the trepan hole; then I found that I could put my little finger into this cavity, where the substances of the brain seemed reduced to a sort of pulp."

"Next day I began to inject this ulcer with barley decoction, sharpened gradually by the addition of a vulnerary balsam. By the 24th day I found the quality of the matter greatly improved, and its quantity lessened. I increased the proportion of the vulnerary water, adding some drops of spirits of turpentine, and balsam of Fiorovanti; and though the patient felt the injection, he became accustomed to bear it. Upon the 30th, finding the opening, though large, not sufficient for the free discharge of a cup-full of matter, which flowed at each dressing from the wound, I had a silver canula made about the size of a writing quill, and an inch in length. From this time there was no retention of matter, it flowed continually, and was absorbed by the lint: the basin of the ulcer filled up, the direction of the sinus became less oblique, the tube lay almost horizontally; and I promoted these favourable appearances by washing out the ulcer, and by pouring an injection through the canula twice a-day at each dressing: During all this dangerous process the patient was so well as to attend the devotions of the monastery: He wished on the 44th day, a piece of lint to be used in place of the canula, that the matter being retained he might be assured how much of the ulcer remained to be healed. This was done; and the matter was found still to amount to about half a cup full: but, soon after this, the canula began to be fixed by the quick growth of the surrounding flesh; the basin of the sore filled up; and on the 62d day the tube was entirely removed. Finally, this Monk left Paris in the month of December to return to his monastery, where he continued to live in perfect health, and the enjoyment of all his faculties; and so cautious was Morand in the authentication of a fact at once so important and so incredible, that he delayed presenting this report to the French Academy till four years after the cure, which cure had of course been witnessed during all its progress by the most celebrated surgeons, especially by Le Dran and Guerin, who were consulted about the operation."

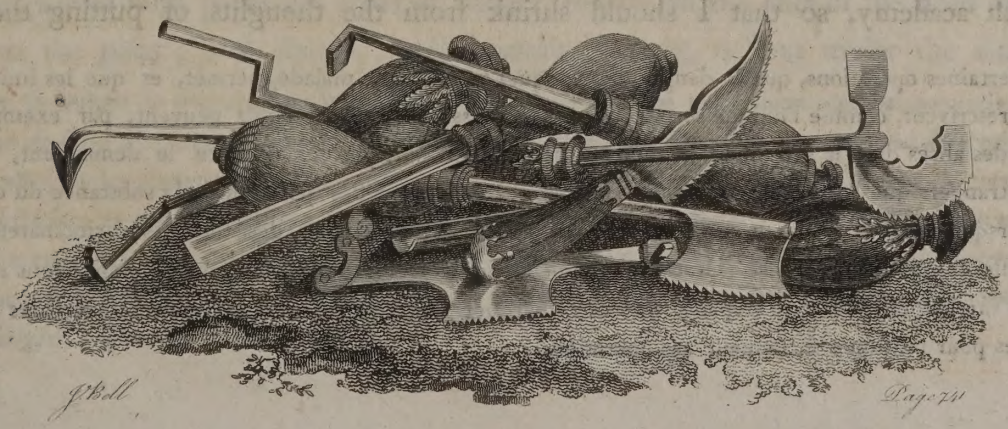
indeed declared roundly that the operation of the trepan itself is harmless! asif it were possible that simple fractures of the skull could be really a cause of danger, while cutting it with saws, making large and wide openings, taking off that resistance which supports the brain, and tearing the vessels which connect the skull with the dura mater could be safe!

It is a propensity so natural with men of our profession to rely on the resources of art, and to mistrust nature, that we seem almost to have forgotten how much unassisted nature can do. It is also an error but too common, to prize highly the learning and maxims which we have acquired difficultly: to carry the speculations of the closet into real practice: to retain the prepossessions imbibed during our younger years, after we are called to those manly duties, which require the exercise of sober judgment and plain good sense. The first great difficulty we feel in acting with a just reliance on our own good sense, is that of believing that any thing usually and openly practised can be entirely wrong; and this again proceeds from our not knowing from what weak men, or from what trivial occasions, many established opinions and practices have arisen. This once explained, the younger part of the profession would find nothing imposing in antiquity or authority, and would trust to the dictates of that ordinary experience and plain sense which is above all learning. Let us turn then to the works of those amongst the moderns who have studied the ancients, prized their learning and adopted their maxims, and whose artificial practice has corrupted ours; surely it becomes us if not to reform our opinions, at least to enquire into the truth of them, and be able to give a reason for the faith that is in us.

From this case I would infer, that such suppurations affecting the lower surface of the brain are very slow in producing their bad effects; that in such suppurations rough methods are both the most lenient and safest surgery; that in the scull, as in the thorax, there is no safe medium, but every sinus or suppuration, which seems to penetrate to the cavity, must be searched to the bottom; and that no such sinus can, on account of the various crooked directions of the internal sore, be searched thoroughly without being opened. The neglect of this I have seen kill very many who had fistulas on the ribs; and let it be observed, that, in this case of Morand's, 1st, The disease must have been certainly fatal without a proper way being made for the matter. 2dly, That they did not know nor even suspect the danger till, having opened the first upward sinus, they came then to a fistula which ran in quite a contrary direction, downwards, leading to the carious hole in the temporal bone, through which the matter of the abscess of the brain itself was slowly and difficultly discharged, the inward and very dangerous ulcer extending in proportion as the matter was so confined.

It is very remarkable, that, in each succeeding period of our science, some fatal influence or other has conspired to perpetuate that fondness for operations, which I account the greatest fault we can be guilty of, and the most dangerous to our fellow creatures. The rage for operating reigned for many years uncontrouled, and he was esteemed no surgeon who did not search with all due diligence for fissures, who did not exfoliate every naked bone according to the strict rules of art. Thus the number and extent of the openings made with the trepan was the sole test of merit in operating; every depressed bone was poised up or cut out with the trepan: only a few men of natural genius for observation and sterling sense, uncontaminated with learning, ventured to deviate from these rules; cured wounds without exfoliating; looked unconcernedly on fractures without trepaning; left even depressions unreduced, and did no more, when they put their hand to the work, than circumstances strictly required. The cures they often saw atchieved by nature have been regarded merely as exceptions; yet I fear that those natural cures have been but too often anticipated, sometimes prevented by our precipitate operations: and I hope so to recommend those exceptions to your notice as to incline you to consider them in a far more serious light, not as exceptions, but as examples of genuine good practice, and the elements of your reasoning. I shall never divert you from giving every help in fractures or depressions, but I shall attempt to set just limits to that servile adherence to maxims of past ages, and to that boyish, busy, meddling disposition which I have too often witnessed. The numerous inventions of chizzels, saws, scraping irons, and tools of various forms for cutting the scull, are a sad monument of the vicious practices of past ages. The instruments I represent in this marginal plate are now fallen into disuse, but the prejudices of those times have not disappeared.

Saws, Rugines & pointed Instruments of various forms for scraping and widening Fissures & fractures.



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In the later and better times of surgery, when, in the great hospitals, every surgeon of eminence practised under the public eye, and was answerable to the profession for his doings; when from the study of anatomy, the decline of false learning, the gradual accumulation of knowledge, and the improvement in real and practical skill, plain sense came to be valued, rules, such as had been transmitted by the ancients, could not continue to hold any influence over the public mind. But at this auspicious period, those very institutions which promised fairly and were fairly designed for the improvement of observation and pathological enquiry, actually revived and strengthened the passion for operating. A society of men was convened in France, by the most ostentatious of all their monarchs, who seem to have been intent on discovering nothing but wonders! wonders of art and wonders of nature! "Who discovered and proved to the *young surgeon*, that he may freely open *Abscess* of the brain, search into its very *substance* for *foreign* bodies suspected to be buried in this viscus: *cut off portions of it* when tainted with gangrene, and *amputate carious or fungous tumours* arising from its substance." "Nor should it be forgotten, (say the member of the Royal Academy,) that we have proved, in a former essay, how well and safely openings may be made with the trepan to allow of these various operations.*" What good such essays may do it will be difficult to say; the danger of *proving* any such matters is very plain: better by far leave such unprecedented operations to be done only from the urgency of desperate circumstances, than make them seem light and trivial by this familiar enumeration of contingencies, which I would almost pronounce imaginary, which, in the outset of life, and in the moment of reading such papers, occupy greatly the mind of the young surgeon, who yet grows old in practice, wondering that he has seen nothing of those *Abscesses* requiring puncture, nor of those *Gangrenes* and *Cancers* of the brain.

There has ever appeared to me something reprehensible in the works of the French academy, so that I should shrink from the thoughts of putting these

* Certaines operations, que le danger, dans lequel se trouve le malade, permet, et que les indications prescrivent, comme l'unique secours que l'on puisse employer; qu'ils peuvent, par exemple, ouvrir des abcès dans la substance du cerveau, rechercher, lorsque les accidens le demandent, des corps étrangers que l'on croit retenus dans ce viscére, retrancher des portions de la substance du cerveau lorsqu'elle est atteinte de mortification, emporter des fungus et des tumeurs carinomateuses auxquelles le cerveau est sujet. On doit se rappeller ici le précis d'observations que nous avons rapportées sur la multiplicité de trépans, afin de remarquer qu'on peut faire au crâne les ouvertures nécessaires pour pratiquer facilement ces opérations.

volumes into the hands of the young surgeon: throughout these papers, the academicians talk of numerous perforations with the trepan! of sawing out large pieces of the skull! of puncturing the dura mater as freely with the lancet as you would puncture a vein! of shaving off the protrusions too apt to take place after such incautious openings of the skull! of the wasting of vast quantities of the brain by abscess, and of safely amputating part of its substance with the knife, in a tone of familiarity neither right nor becoming, and requiring the strong antidote of facts and reasoning, and authority, as there is much authority against such doings: The authority of men who in the ages less tolerant, and less enlightened, had the sense and courage to oppose similar doctrines, and refrain, even when the occasion and temptation were fair, of acquiring reputation without blame.

"The young surgeon, seduced by such precepts, tempted with a likely occasion of acquiring fame, and fortified by the authority of a whole academy of surgeons, convened for the purpose of ascertaining the principles of our art, may rush into these desperate enterprises; we should therefore guard him against such misconduct, by instilling early into his mind just principles and modest thoughts." This is what I should naturally say. Mr Quesnoy says much the reverse; "Surgeons, for fear of their reputation, have ever chosen to leave their patients to perish rather than to make such attempts: though, perhaps, our fears in respect to punctures of the brain may be ranked with those of the ancients about puncturing the dura mater.*" I would not for a dukedom charge my conscience with the faults which suggestions like these may occasion; and cannot but wonder at finding Mr Quesnoy expressing no apprehension but about the import of the signs which mark such abscess, and no regret but that "the abscesses of the brain are not always advantageously placed for the use of the lancet," and that sometimes this kind of injury presents itself like a counter-fissure in the part of the scull least suspected, and opposite to that injured. "We may then, (says Mr Quesnoy) where the palsy is accompanied with particular signs of danger, trepan on the side of the head opposite to the palsy; and should we find nothing wrong, neither under the scull

* Dans la crainte de trop exposer leur réputation, les chirurgiens ont mieux aimé laisser périr le blessé que de faire une telle tentative; cependant notre crainte d'ouvrir le cerveau peut être comparée à celle que les anciens avoient d'ouvrir la dure-mere: aujourd'hui l'on n'hésite plus à ouvrir cette membrane, et cette opération a sauvé la vie à une infinité de blessés. Peut-être que les praticiens qui nous suivront seront surpris *aussi de notre timidité à ouvrir la substance du cerveau:* nous avons déja beaucoup de faits qui nous reprochent cette timidité, *et qui nous excitent puissamment à risquer dans les cas désespérés l'opération que nous proposons.*

nor under the membranes, venture a few slight incisions into the substance of the brain." Could it be believed, that any man could make the insensibility of the brain (though proved and acknowledged) an argument for plunging the lancet, upon every suspicion of abscess, into its substance, or work himself up to such a fervor, or rather phrenzy, as to speak thus familiarly of a few slight incisions into the substance of the brain? It is in the next paragraph that Mr Quesnoy speaks of the insensible nature of the brain *; but the paragraph is so audacious, that, in place of translating it in my text, I transcribe it on my margin; there let it stand, like a beacon on a foreign shore.

Next arose Mr Pott, a surgeon of unrivalled excellence, whose influence was fairly acquired. But let those who have influence with their profession use it discreetly and wisely: let them ponder well the maxims they announce: for Pott fell into a system of practice so bloody and enterprising, that, in the few years which have elapsed from his death, it has fallen into utter discredit, and he delivered his maxims in a stile so decisive and imperative as to impose even now upon the younger part of the profession, while, by all who judge for themselves, his practice is abandoned †: no wonder it is abandoned, being, in every point, except one ‡, repugnant to good principles. He, in every case, whether slight or dangerous, *cuts off the whole puffy tumour*, scalping the part with a circular incision §: he,

* *Et si on ne découvre rien sous le crâne ni sous les membranes du cerveau, on peut hazarder quelques petites incisions dans la substance même de ce viscére. Pour s'assurer s'il n'y a point dans la substance corticale, et même au-delà, quelqu'abscès qui soit la cause de ces accidens, une telle incision n'est point à redouter pour la vie du malade; car si l'incision rencontre l'abscès, elle peut sauver la vie; ET SI ELLE NE L'ATTEINT PAS, CET ABSCES FERA PERIR LE MALADE INDEPENDAMENT DE L'INCISION; ELLE N'EST PAS A REDOUTER NON PLUS PAR RAPPORT A LA DOULEUR, CAR ON A SOUVENT OBSERVE QUE LA PROPRE SUBSTANCE DU CERVEAU EST INSENSIBLE.*

† In the accounts which we have of the former practice in France, it is related that surgeons made numerous perforations along the whole track of a fracture of the cranium; and, as far as I am able to judge, without any very clear design. Mr Pott also advises such an operation, with a view to prevent the inflammation and suppuration of the dura mater, which he so much apprehended. But many cases have occurred of late, where, even in fractures with depression, the patients have done well without an operation. *Abernethy's Essays.*

‡ Vide page 495 of this volume.

§ It is no extenuation to say that Sharp did so before him; past and present authorities declare it to be murderous practice.

in every suppuration of the dura mater, and in every case of extravasated blood, *applies the largest trepan*, though he has no other purpose than to give vent to such matter or blood: Dissatisfied (as he had reason to be) with the small trepans in common use, he ordered them to be forged for him of an unusual size, and did not spare their liberal application. After perforating the scull once, in place of providing by other means for the free evacuation of the matter, he applied his trepan again and again, till all the suppurated surface of the dura mater was displayed, declaring it to be his intention to cut away all that part of the scull, however extensive, under which the suppuration existed *.

" When the operation, says Mr Pott, has been performed, not as a preventative, but to give discharge to matter, the only chance of relief is from laying bare a large portion of the dura mater, that the discharge may be as free, and the confinement as little as possible, as nothing but this can do good.†" And again he says, " Yet perforation is absolutely necessary, in seven cases out of ten of *simple undepressed fracture* of the scull." He does by no means deliver these rules with temperance or modesty, but says, " I am as well satisfied of this as of any truth which repeated *Experience* may have taught me ‡."

Such bold words lose all power when we begin to find how ill experience may teach a man, and how unreflectingly such language is used. At first, the reader would naturally say within himself, " Surely Mr Pott, before he could use such confident language, must have seen repeated and afflicting proofs of the necessity of using the trepan:" but to his utter confusion, he finds the very words repeated in commending the now absolete operation of scalping, and, indeed, on every occasion, trivial or important, for it is with this author, a manner, and no more: He says, § " The way of doing this, (viz. of scalping) has formerly been the occasion of much difference of opinion; but THERE CAN BE NO DOUBT *about the greater propriety* of removing a piece of scalp for this purpose, *by an incision in a circular form* !" Even when Mr Pott applied the trepan, not on account of any present, but of some eventual, perhaps imaginary danger, he set no limits to the number of perforations, but the extent of the fracture: He says, ‖ " If the trepan be applied in a preventative sense mere-

" Et ex sloicis quidam medici sunt qui amputant Angulos vulneris et projiciunt; et est illa intentio in qua non est nisi fatuitas." *Brunius Chirurgia Magna, lib.* 1. *cap.* 17.

* Vide page 138. † Vide page 178. ‡ Page 145.
§ Page 169. ‖ Page 177.

ly, *the length of the fracture must determine the number!* one or two only may be made at first." In short, all his precepts, most of his cases, and even the very form and size of his instruments, contributed to renew and strengthen that passion for frequent perforations and large openings of the cranium, which the decline of false learning and the progress of plain good sense had almost allayed: and I will venture to say, that whoever has studied his writings, or imbibed his principles, must imagine that, in the work of trepanning, he can never do too much, and is only blameable where he has left any possible thing undone.

Unfortunately this passion for leaving nothing imperfect in a difficult and dangerous operation, nothing that might endanger the surgeons reputation or his patient's safety, is not a learned maxim, but a most natural propensity, one which has prevailed in all ages, requires all our discretion, and should be kept under due restraint. That every the slightest depression should be trepanned is a notion which gradually and insensibly insinuates itself into the mind of the young surgeon, who says within himself, "If soft and fluid blood oppress the brain so dangerously as to require perforation of the scull, how much more deep and deadly must that oppression be which proceeds from a hard and firm bone depressed and driven inwards upon the brain, and so immoveably fixed that it cannot be raised: surely it should be cut out with the trepan? "If the trepan be at all useful, to be entirely so, the operation must surely be compleat? If there be danger from depression of the scull, or from blood or matter being confined under it, surely every depression, even the slightest, should be raised, nor must large openings be spared, seeing they are necessary to give free vent to the matter or blood?"

This, I believe, is but giving words to a prejudice, which, though not avowed, is yet universally felt: such prejudice arises from inexperience and fear: nothing indeed but fear and ignorance could make a man think it his duty to raise every slight depression, or believe it a fatal error to leave the slightest imperfection in that part of the work. The passion for raising depressed bone, for obliterating even those slight dimples, of which the sculls of children are so susceptible, gave occasion to the most puerile and ludicrous inventions: the project of discovering fractures by making the patient crack walnuts, or hold a wire in his teeth, are not more ludicrous: and we feel mortified to observe even the sagacious and sober Hildanus occupied as fervently as the greatest fool among those inventors, in laying down various rules and methods for elevating depression in

boys, or in men, according to their various ages. To prove that we never should be at a loss for instruments to perform so laudable a work with, he relates the case of a country fellow, who, being wounded in the head with a halbert, fell down as if dead: a surgeon of respectable skill being called to his assistance, found him seemingly apoplectic, and liker death than life: having no elevator nor any suitable instruments at hand, he procured a carpenter's gimblet, screwed it into the chink betwixt the two fractured bones, raised them to the level by the hold it gave him, and extracted several splinters of bone *."

It had been well if Hildanus had confined himself to the eulogium of a resource, in some degree sensible and necessary. Wurtzius desires all such dinges and impressions to be left alone: saying, " Circa impressum cranium non multum laborandum :" how much, on the contrary, Hildanus toiled in this occupation, you may judge from this, that he invented various plasters, which, being laid upon the head of the child with a string in the center, operated like a boy's sucker fastened to a stone: by pulling the string, you raised the depression: and Hildanus adds this special direction, that, in place of altogether shaving the hair, you should only cut it close, that the plaster might stick to the roots! Next, he invented a sucking-horn, which he has very carefully delineated, which, being applied like a cupping-glass, and sucked by a man of strong breath, raised the depression! and, finally, he directed that the child should strain its own breath, or that if it would not or could not do so, you should close its mouth and nostrils, and hold in its breath, to assist the external suction. Thus did he suck out the dinges and depressions from the sculls of boys; but to maintain the bone on its due level, after being thus raised, he fell upon a more profound invention, more applicable to depressions in men, whose bones are firm: " A depression of the scull, though elevated to the level, is, according to Hildanus, apt to fall down again;" to prevent this, he invented a shorter screw with two holes in it, and fixing this screw in the depressed portion, he pulled it up, and put a pin through one of the holes in the screw, to prevent its falling down again, and there left it: " And mind," says Hildanus, " to have a file at hand to file off the

* Hildanus himself assisted at this operation, and assigns his reason for transcribing it as a precedent. " Haec propterea adscribo, ne fidelis ac diligens chirurgus aegrum periclitantem, propter penuriam instrumentorum relinquat."—p. 83.

end of this cross bar if it should prove incommodiously long *. The marginal plate at the head of this chapter is the cucurbitulum of Solingen, (says Purmannus) designed to raise the scull up again, that by some ill accident hath been depressed : it ought to be made of pewter, and proportioned to the dimensions of the wound : it has a piece of leather about the neck, and a leather strap through the two ears, to raise the cucurbitulum with, after it hath been placed upon the depressed scull, with a large flame."

These are the mechanics of fractured scull, as enteroraphy or the sewing of wounded intestines is of hernia: closet speculations, inapplicable and unprofitable †. Even the necessary, simple, and useful instrument, the lever, for raising depressions and picking out bones, has been so praised by Petit, in his paper to the French Academy, as to make it appear as if the raising of depressions were the whole scope and purpose of the operation of trepan ; and such a spirit of enterprise has arisen, that one surgeon ‡ boasts of having laboured to raise a depression, much against the sober precept of Wurtzius, (non multum laborandum) with two strong able bodied surgeons, and four levers, applied all at once, under the depressed bone, with a proportioned exertion, no doubt, to keep the head of this unfortunate person firm upon the table! What an absurd and ludicrous idea of the modern art of surgery must this convey ?

* It was indeed very long before they would venture to believe or publicly affirm, that a depression once elevated would keep its level. Witness the following passage in Berengarius : " Admiraberis lector quia dixi magnum ossis frustrum esse elevatum, quod erat depressum, et ad situm naturalem reductum, et ibi remansisse ; sed est verum, et pluries hoc contingit ut magnum ossis frustum in fractura cranii, vel incisione à re gravi non subtiliter incidente, plicetur, et inferius notabiliter descendat, quod indiget elevatione, et elevatur, et *stat in loco suo ut prius.*

† " Such depressions, (says Hildanus) though not immediately followed by dangerous symptoms, make the boys very heavy and stupid, and very subject to rheums in the head; besides such depressions are often relieved merely by applying a cupping-glass, as recommended by that celebrated surgeon Paraeus : or rather, apply the sucking-horn which I have given a drawing of; let a strong breathed man suck, while you hold the mouth and nostrils of the child!"—*p.* 83. *Hildan. Opera.*

N. B. when the depression is to be raised by the plaster, composed of pitch, rosin, gum elemi, &c. an operation of which I have, on the next page, given a drawing from Hildanus, still the mouth and nostrils of the child are to be closed. " Interim autem, dum chirurgus emplastrum aufert, os et nares infantis, ut antea quoq; monuimus, claudendae sunt. Sic inflato cerebro propter retentionem in ipso spirituum, cranium impressum facilius in situm naturalem relevabitur.

‡ Vide O' Halloran's Cases.

With the best and soberest surgeons, this passion for raising depressions has been so universal, that, in the younger members of the profession, it is pardonable. They are impressed, during the whole course of their education, by all the expressions used in books, by the narratives of cases, by the very form of our instruments, and especially by the multiplied inventions of screws and levers, with this belief, that no motive for applying the trepan is so legitimate, none so fully authorises the largest openings, and every kind of violence, as the hope of raising a depression of the scull. I question whether many of you have imagined any other reason, or heard another motive assigned for using the trepan; which yet is so far from being the just one, that I pledge myself to prove to you, that no judicious or skilful surgeon will give himself the slightest pain to think about a mere depression, unaccompanied, as it often is, with bad symptoms. Indeed I have here much reason to advise you how to read and what to imitate: I shall proceed, with no supercilious humour, but in truth and soberness, to question many received axioms, and reverse some rules of practice: you will decide for yourselves at some future period, when time shall have abated your enthusiasm and improved your judgment, whether I have done well in advising you against this passion for operating, or have taught you the right manner of reading books and construing facts.

Having marked out, as worthy of your particular observation, certain points, in which sense and learning will ever be at variance, I proceed to teach you a sober and modest line of practice. I could have no pleasure in frequent allusions to past errors, unless they had an immediate relation to modern practice. Enterprising operations are in vogue, chiefly because such doings are spoken of with commendation, and recorded among the wonders of surgery. While the old surgeons allowed not the slightest chink, fissure, or rima, as they called it, to escape investigation; the slightest fissure, or the bare suspicion of one, was the signal for applying the trepan, and there was nothing so gratifying to them as a fracture so circumstanced, or an extravasation so extensive as to require, or at least to vindicate, the application of the trepan ten or twelve times. It was not that the crown of their instrument was small, and thence its application, necessarily frequent, to make even a moderate opening; they scrupled not, after making numerous perforations, to cut up all the intermediate pieces of bone with the saw, and clear away a whole parietal bone, or half the scull. This was the pomp and pride of surgery in former times, which you are called upon to imitate, by the approbation with which such facts are now commemorated, and by the very form of instruments put into your hands, which are by no means calculated to make very moderate openings: the making very large openings, either by large trepans or frequent perforations, is a practice highly commended in every book, and the extent of the fracture is usually reckoned the sole limits of the opening.

" In extensive fractures [says Dionis] we should not hesitate to make two, three, or four perforations, if required. A young girl, of eleven or twelve years of age, having, by a fall down stairs, fractured the whole of the parietal with a part of the temporal bone, Mr Marechal trepanned her next day in two places: he made his son trepan her a third time; he allowed my son, who was present, to trepan her a fourth time: he next day, applied the trepan twice more, and in the end had actually perforated twelve times, and cured her completely. So precious an example shows how little reason we have to be surprised at the frequent application of the trepan*." Here is a doctrine laid down which,

* " Lorsqu'il y a grands fracas et plusieurs fentes, on doit faire deux, trois ou quatre trépans, et même davantage, si la nécessité le demande. Une jeune fille âgée d'onze ou douze ans, tomba sur un escalier en 1705. et se brisa tout un parietal avec une partie du temporal. M. Maréchal dès le lendemain la trépana en deux endroits, il lui fit appliquer un troisième trépan par son fils, et un quatrième par mon fils qui étoit présent. Le lendemain il lui en appliqua deux autres, et par la

I fear, there is little occasion to enforce; and I cannot but persist in being surprised and shocked, at the frequent and large perforations which I have both read of and seen, and cannot but think of these veterans in surgery in no very amiable light, when I see them indulging their boys in the novelty of operating, probably on very slight compulsion.

These reports, and especially the last clause of this paragraph, viz. "that we should not be surprised at the number of trepans," have plainly a reference to the ever memorable operation performed in the time of King William's wars on Philip Count of Nassau, by Henry Chadborn chirurgeon. Godifredus, chief surgeon to the States of Holland, mentions with particular exultation this operation performed by his friend, who trepanned the cranium of the Count of Nassau twenty-seven times, and ascertained the fact by the most indisputable authority, for he made the said Duke of Nassau, after he was recovered, on the 12th day of August 1664, write the following curious certificate. 'I the under written Philip Count Nassau, hereby declare and testify that Mr Henry Chadborn did trepan me in the scull twenty-seven times, and after that did cure me well and soundly."

Twenty-seven crowns of the trepan of the most moderate size, applied to the human scull, must, as I should guess, cover the whole, and there could be little occasion to chizzel out the intermediate pieces; but there is one celebrated author of the present age, who can tell us expressly and accurately, it is Mr Lassus of the school of health, professor of surgery, whose book on surgical operations is published in the third year of the *Republic one and indivisible.* Would you believeit! This gentleman is at pains to gauge the scull in order to bring the matter to a geometrical certainty, and ascertain beyond dispute how many crowns of the trepan may be applied to the scull. "There is no part of the cranium (says Lassus,) inaccessible, except its base; though the bumpy part of the occipital bone should be avoided on account of its

suite il la trépana jusqu'à douze fois, et elle en est très-bien guérie. C'est la fille de M. le Vasseur logé à l'Extraordinaire des Guerres à Versailles. *Cet exemple si rare* fait voir qu'il ne faut point s'étonner sur la multitude des trépans —*Dionis, p.* 522.

This "rare," or precious example, all the parties were so proud of, that Mr Marechal afterwards, in the memoirs of the academy, adds circumstances which tend but to make the proceeding more extravagant, and increase our wonder at the child escaping alive, for he had left but a line betwixt each of these twelve trepan holes, and with his leveller tore them all up, so as to convert all the perforations into one great opening. "M. Maréchall avoit laissé entre les trepans environ un ligne d'interval qu'il fit sauter avec l'elevatoir, pour ne faire qu'une ouverture de tous ces trepans."

thickness, and the lower corner of the parietal bone, on account of the spinous artery which is imbedded in it. Upon marking the scull with the head of the trepan, avoiding all the sutures and the lower part of the occipital, and scaly part of the temporal bones, it will be found *possible* to apply the *Trepan forty times, or more*, on the human scull. This lessens our astonishment at the operation quoted from Vender Wiel, performed on a gentleman of the house of Nassau."*

Still, like his countryman Dionis, Lassus seems pleased with this vindication of the courage and enterprise shown by the said Henry Chadborn, and seems animated with the hopes of such surprising things revolving again in his own lifetime. This report of the square superfices of the human scull, though it may be very flattering to those who indulge this passion for operating, is by no means wise or prudent when addressed in an elementary book to young and inexperienced men; and you must be conscious that while examples and arguments of this tendency are put before his pupils, in every book of surgery, a teacher has a duty to perform before entering on the direct principles of no unimportant nature. I am not only excusable in holding such practice in contempt; I am called on to repress it. Only a few men of strong natural sense, among whom Platner is one, have had the sense and courage to protest against such doings. "There is by no means any necessity (says Platner,) to have recourse, in all cases of fissure or fracture of the scull, to instruments to cut them out with: where there are no evil signs, the trepan is not required:† but unhappily the most extravagant and foolish things are best remembered, and oftenest repeated, while these solid remarks of a man of skill and judgment are but too easily forgotten.

We find that it had been the practice of the older surgeons not only to apply their trepans the whole length of a longitudinal fracture, but along each of the radii of a star-like fracture, and in short, to repeat the expression of Platner, 'to cut it out.' The testimonies of the most sensible writers are against the operation,

* "Si l'on veut se donner la peine d'appliquer sur le crâne d'un squelette autant de couronnes de "trépan qu'il est possible d'en appliquer, en évitant même toutes les sutures, la partie écailleuse du "temporal et la partie inférieure de l'occipital, on trouvera qu'il est possible d'appliquer au moins "quarante couronnes de trépan sur une tête humaine. Cela rend moins étonnante l'observation rap- "portée ci-dessus d'après Vanderviel, relativement à un homme de la maison de Nassau qui fut "trépané vingtsept fois."

† Nam necesse non est, ut in omni fissu fracture Calvaria ad ferramenta veniamus quibus illa excidi solet, "quod si enim nulla mala sunt indicia modioli usus supervacuus est." § 552.

and most unfavourable to the men who have indulged it, for it has been ascribed not to reason but to pride. " If the opening (says Wiseman,) in the fractured scull be not sufficient, make one in the most declining part, and raise up the bones, and free the membrane of whatever may offend it, but *do not* take *out any more bone than needs must*, like some of those surgeons I have met carrying them about in their pockets, BOASTING IN THAT WHICH WAS THEIR SHAME." Never is the apology wanting to those who are proud of making numerous preforations : if they do not find a conspicuous depression, or a great length of fracture, they affect to be seeking for pus, or that they are anxious to let out extravasated blood. They dare not forsooth, after making the necessary opening, allow the pus to ooze out gradually, or the blood to melt down and be resolved into serum. They affirm, " that it is infinitely more dangerous to wait the dissolution of the coagulated blood than to make numerous perforations for the evacuation of such pernicious juices, for not only such openings as that we have just mentioned of 12 trepans, but openings much more extensive, close easily."* " I have seen surgeons, says Ravaton, so infatuated, so desperately bent on discovering abscess on the dura mater, that, after applying six crowns of the trepan, they would, I verily believe, have pulled away all the remaining bones of the cranium, had not their patients been delivered by death from such operations."† In short, their doctrines and practice outraged common sense : every thing was to be done by the surgeon, nothing left to nature : every depression was to be elevated ; the whole matter to be evacuated ; the whole extent of the extravasation to be covered by trepan holes, and the limbs and whole extent of a radiated fracture were

* Il y a beaucoup moins de danger pour le malade de multiplier les trépans pour évacuer ces sucs épanchés devenus pernicieux, *que d'attendre une plus grande dissolution qui augmenteroit le perilē ; car non-seulement les grandes ouvertures du crâne, telles que celles des douze trépans dont nous avons parlé, mais encore de beaucoup plus grandes, se ferment facilement.—Quesnoy, page* 258.

† A combien des chirurgiens qui sont d'ailleurs fort habiles, mais qui ignorent ces connoissances ; n'est il pas arrivé de se meprendre, et d'appliquer le trepan trop tard ou sans necessité ; J'en ai vû de si obstinés a chercher un depôt, qu'apres avoir appliqué six couronnes sans rien recontrer, *ils eussent, je crois, enlevé le resté des os du crâne, si la mort ne leur avoit enlevé leur patient.*

Mais quand le depôt qu'ils cherchoient auroit été recontré et enlevé, comme s'il n'y en avoit jamais eu ; la raison et l'experience de tous les tems, ne montrent elles pas, que la multiplicite de ces sortes de playes doit etre mortelle, que la regeneration de la peau que vous coupez ne peut jamais se faire. Je passe sous silence le premieres accidens, qu'occasionent toujours la lezion du pericrâne ; les os mis a nud, bien ruginès, &c.

to be cut away. There were no limits assigned for these openings, but the extent of the extravasation or fracture, and they were well contented to find that 40 crowns of the trepan might upon necessity be applied to the human scull!

But there is a scene of practice very different from this, where men, engaged in the actual duties of the profession, in peace or in war, in cities or in the field, learn to look coolly on wounds of every description, and know from experience what nature will do, and how impertinent and vain those operations are. It often happens to grooms or farriers, trimming horses feet with too little precaution, that the horse striking out, they receive the kick full in the forehead: the scalp is torn up, the scull manifestly injured or not a little depressed; these men live a coarse irregular life, and yet such fractures heal easily, but, were the trepan applied on every such occasion, we should have many dismal scenes. It often happens that boys playing with horses, plucking hairs from a colts tail, for example, are knocked down by a kick in the forehead; often the bone is deeply depressed, very often the marks of the heels or caukers of the shoe are impressed upon the os frontis; sometimes a piece of the bone is actually turned upwards along with the scalp; but the scalp being reapplied to the scull, the splinters of the bone picked away, and the ragged integuments smoothed and secured with stitches, the boy, without one hour of sickness, recovers as if his wound were only of the skin. But were such pieces of depressed or shattered bone cut out; were openings made at all proportioned to the depressions or to the extent of the fractures; were the delicate dura mater of a boy left exposed to that force of circulation, which dilates the brain, and fretted by every stroke of the arteries against the margins of the opening, the dura mater would slough, the brain protrude and suppurate, and the boy expire howling and convulsed: Examples of such imprudence and such consequence I shall presently relate, for I know, that when my business is to impress you with any practical truth, the best way of confirming the maxim and making you feel the force of it, is plainly to represent the scene.

Often the recovery where the scull is very deeply wound, is so rapid, as to surprise those even who are the most resolute in refraining from the use of the trepan, and the best prepared to expect a happy issue. The faith and credit of Parus stands unimpeached; and the case he relates, of a cure performed with his own hand, is the most remarkable of any yet recorded; since even the segment of the scull isself in a clean

sabre-wound, adhered again in common with the wounded scalp. "I advise (says Pareus) wherever there remains a portion of the skin still connected with the wounded scalp, that neither that skin, nor the divided portion of bone be cut away, but the bone sewed up along with the skin: What Celsus commends, (says Pareus) I performed in the case of Captain Hydron, who was a short while ago wounded in this city with a sword through the center of the os frontis, the bone being cut down the length of three inches, so that it hung over his face, connected with the scull only by its pericranium, and about three inches of the fleshy scalp. At first sight, I questioned whether or not I should complete the separation of this piece of skin with its adhering bone, but remembering Hippocrates's maxim never to uncover the brain, I cleansed the blood, which was upon the dura mater, laid up the separated piece, and, for the better retension thereof, made three points of the needle in the upper part, and put in three small dossils in the sides of the wound, the whole being so nicely replaced, that, by God's grace, it healed perfectly, though the gentleman was otherwise much wounded on the face, in the thigh, and in the right breast. I finally beseech you (says Pareus) never to amputate neither skin nor bone, lest the brain should be left bare *."

In the work of Berengarius, De Fracturis Cranii, so much and justly praised, you have no instructions for discovering, nor any warrant for trepanning fissures.

* Or il faut icy noter, que s'il aduient qu'il y ait grande playe apres auoir coupé du tout l'os, et que portion du cuir musculeux fust demeurée sans estre entierement coupée: en tel cas ne faut parachever de couper ledit cuir, ny separer l'os (qui sera du tout coupé) d'auec le Pericrane, mais reduire lesdits os et cuir ensemble en leur lieu. Ce que Celse commande, et feis au Capitaine Hydron, lequel puis peu de temps fut blessé en ceste ville d'vn coup d'espée au milieu de l'os Coronal. Et estoit ledit os coupé du tout iusques à la dure-mere, de grandeur et largeur de trois doigts ou enuiron, tellement qu'il se renuersoit sur le visage, et ne tenoit plus qu'au Pericrane et cuir musculeux, enuiron trois doigts et promptement voyant icelle playe, fus quasi d'opinion de parachever du tout le couper: mais ie consideray qu'Hippocrate et les autres bons praticiens ont tousiours prohibé de ne laisser le cerueau descouuert, s'il est possible: puis i'essuiay le sang qui estoit tombé sur la dure-mere, laquelle on voyoit mouuoir al'oeil; puis réuersay la piece qui estoit separée, la posant en son lieu: et pour la mieux retenir, feis trois point d'aiguille aux parties superieures, et mis de petites tentes aux costez de la playe, afin de donner issuë à la sanie. Et le tout fut si bien adapté, que par la grace de Dieu il en guarit; jaçoit qu'il eust encor plusieurs grands coups d'espée, tant au trauers d'vne cuisse, qu'au visage, et vn autre au costé droit pres la mammelle, passant le long des costes, penetrant outre de l'autre part en la partie basse de l'Omoplate. Et pour conclurre, ne faut faire amputation de l'os ny cuir musculeux qui ouure le Crane, et moins encores des os d'iceluy, sinon le moins qu'il sera possible, de peur que le cerueau ne soit descouuert.

He seems to have been taught a very different practice by his father in his earliest years. They seem, in these times, always to have felt a sort of trepidation when they sewed the scalp; and Berengarius gives many anxious directions about undoing the stitches upon the slightest appearance of fever or abscess *; but still he directs that the scalp be sewed.

Especially when the bone was wounded, they feared to sew the integuments; yet Berengarius, while he complies with the rule, relates an exception highly worthy of notice. He reminds his reader that he had advised the suture of the scalp only when the bone was unhurt and the pericranium entire; "for a suture (says Berengarius) being drawn close over a diseased bone, the patient dies, wherefore, such wound must be dilated and opened, not sewed and closed: Yet, I call God to witness the truth of the following narrative, so unprecedented that I dare hardly tell what I saw. While I was a young man, a soldier wounded his fellow with a weapon, and cut down the os frontis from its upper part to the superciliary ridge, so that the os frontis, with its integuments, hung over his eyes, divided from above and at the sides, and connected only below. My father went first to his assistance, and removed the bone from the integuments; the bone was the whole length of the os frontis; the dura mater was untouched. The skin of the forehead was replaced and stitched without that opening at the lower part of the wound which surgeons are accustomed to leave as a drain for the matter; being closed with white of eggs, and dressed daily, it was in ten days compleatly reunited, and ever after the systole and diastole of the arteries was distinctly seen where the bone was wanting †. This I have put

* Debet etiam esse intentus ad accidentia, puta an supervenìat febris, vel apostematur locus, vel retineatur sanies, et illis visis removeat punctа statim et res bene succedat." "Suatur ergo si sutura indiget, &c.—*Page* 121.

† Nota tamen lector, quòd dixerim suturam fieri debere ubi os non fuerit laesum aut pericranium: quia, si in tali casu fieret sutura, stante osse laeso esset mortis causa: debemus enim detegere et aperire, non autem claudere et suere vulnera. Deum tamen testor, me vidisse unum casum quem narrare vix audeo ob magnitudinem. Dum essem juvenis accidit Carpi ut quidam Bernardinus Spacinus vulneraret Bernardinum Vicentinum (ambo autem erant milites Illustris Domini Marci Pij de Carpo) telo vulgo dicto roncha, et totaliter os frontis à superiori ad inferius usque ad supercilia separaret, ita ut cranium esset annexum cum cute frontis, cutis tâmen circa supercilia non esset separata totaliter, sed incisa in superiori parte tantùm et à lateribus. Et ita os et cutis frontis cooperiebant oculos patientis. Ad hunc vulneratum accessit genitor meus, et statim amovit os à cute frontis: et os illud erat latum et longum sicut tota frons et dura mater non erat in aliqua parte laesa. Est statim amoto osse suit cutem frontis in loco suo, sine aliquo spiramine, et apposuit albumina ovi cum stuppa.

down, says Berengarius, to make medical men keen and courageous in curing wounds."

Besides these instances in domestic life, it is remarked, to the dishonour of our trade, that in times of war and trouble, when men are not allowed to take care of their wounds, those who are least cared for are soonest cured; and a man, who is forced to wrap a clout about his head and ride for his life, is safer than one who is chambered up, dieted, and dressed, perhaps trepanned by the surgeon. The great rebellion was full of such adventures and hair-breadth escapes, many of which are related by Wiseman: among others, that of "a gentleman who, a day or two before the battle of Worcester, attending the Earl of Derby in his retreat thither, received a large wound between the sagittal and coronal sutures by a sword, which went through the cranium to the dura mater, is exceedingly remarkable: the membrane was covered with small shivers of bones: he had only a thin linen cap over it, his haste not permitting him to be dressed, and it may be it was the better for him, for if dossils had been hastily crowded upon the bones, severe symptoms would have followed; whereas the shivers lying lightly upon the membrane, he was free; and being ignorant of his danger, rid a great journey: I after took them out, and dressed the membrane with digestives, the short time we were together." It was upon such proofs that Wiseman came to be persuaded of this general truth, that "RECENT FRACTURES OF THE CRANIUM DO FREQUENTLY UNITE LIKE THOSE IN OTHER PARTS, if the matter hath liberty to discharge from within. Therefore having raised up the bones that are loose, dress the others dry *."

You will not easily find a more dramatic representation of such a wound, nor a more artless narrative of a cure, than that of the soldier wounded at the fight at Worcester. "At the battle of Worcester, a soldier came to us where we were dressing, with his sword in his hand, the blade broken off near the hilt, with many wounds on his head. I, seeing the hairy scalp of one side of his head hanging down his

In secunda visitatione applicuit meum cerotum quod humanum appellatur, à me inferius describendum, et consequenter simul in die mutabat cerotum; et in decem diebus hic fuit senatus, tanquam si fuisset vulnus simplex. (Certè apparent interdum miracula in natura) et iste vixit longo tempore, et semper apparuit motus diastoles et systoles in loco in quo deficiebat os.

Haec dixi ut faciam medicos animosos in curandis aegris, quia ipsis interdum magna contingunt, sivè haec accidant à medico sive ab aegro propter aliquam siderum qualitatem, vel aliundè.

* Wiseman, page 113. vol. ii.

neck, went to him; and calling my friend Will. Clarke to me with a sponge to cleanse the wound, we saw six pieces of the scull sticking on it: some of them were of the first table, others of both tables. Besides which, there were various fissures, *sedes*, and some fractures, with depression, made by sword, musket-stock, &c. We freed the scalp of those bones, and returned it upward so far as we judged it necessary; then cutting off what was superfluous, tacked it to the sound parts by several stitches distant from one another, leaving a space to dress the depression and greater fractures. Then we dressed up the wounds with digestives *ex terebinth*, &c. and where the dura mater lay bare, we applied pledgits dipt in *ol. ros.* and to the other parts of the cranium, *liniment. arcei.* The alarm growing hot of the enemies entering the city, I left Will. Clarke to bind it up, and made my way out of the town. But this young chirurgeon, being taken busied in dressing the wounded soldiers, had liberty, after the heat of the fight was over, to employ his charity in dressing some of them, and writ me since this soldier's particular case: viz. The third day he found him pretty hearty, and his wounds mattering so very much, that he was necessitated to cut loose two of the stitches, to give vent to it: then he dressed the penetrating wounds with *mel. ros.* and the cranium with lint pressed out of *spir. vini*; and proceeding accordingly in the cure, saw the depressed and mangled bones cast off, incarn, and cicatrize with the rest. The soldier, being thus cured by him, made a voyage to the Indies, and since had served a soldier in the Tower of London.

"During the war (says Wiseman) I was frequently employed in the dressing of some one person or other, wherein I have seen all or most of the several sorts of fractures. I have dressed many that have been cut through the scull, *the shivers of the bone lying pashed with the flesh and the hair, upon the dura mater*; yet the patient hath had no symptom of such a wound." Here, in a few sterling words, are descriptions which will better satisfy all your doubts than the most learned arguments.

So much for open wounds, when the clean incision of a weapon seems to have done the business of the trepan. But, even in cases where the bone is fractured with a wide and portentous fracture, or when it is actually depressed in a way which might vindicate the application of the trepan; in cases where it requires some courage to refrain from operating, the patient is cured with surprising ease. I can be at no loss in proving this in a thousand various forms; if I could feel any difficulty, it must be only in selecting the cases which best represent the variety of cir-

cumstances. Mr O'Haloran, who practised in Dublin, the metropolis of broken heads, might very naturally feel himself engaged to write on fractures of the scull: In his paper in the Irish Transactions, we find, among other cases, that of Edward Power, "who received a desperate wound of a back-sword, extending from the top of the coronal bone to the orbit of the left side, forming *an extended and frightful chasm*, in which were included *the bone, membranes, and brain.* It bled considerably, as well may be supposed. He remained exposed to the air for near three hours after, and had not so much as a bit of rag to cover it: fever and inflammation of the brain might reasonably be apprehended; yet, by a couple of bleedings, and some other antiphlogistics, the man was completely cured in five weeks, without exfoliation or the smallest operation."

On one point you may naturally feel some hesitation: You see that clean wounds, as when a trooper is cut to the scull with a sabre, are not, (even when the scull is fractured, or part of it sliced away,) attended with that danger which was once supposed; but fracture of the scull produced by a heavy blow, where the bones are broken, perhaps depressed, may be, nay must be, an injury of quite a different nature. You are not only to refrain from trepanning fissures, in the absence of dangerous symptoms, but, if I may advise you, even fractures very wide and gaping. "John Smith," (says Mr Hill in his Book of Cases,) "when forty years of age, had several inches of the scalp torn off by the kick of a horse, and some of the hair was beaten inwards through a long fracture of the scull, which was so wide that there was no occasion for the trepan. He recovered in a few weeks, and is well." Why does Mr Hill announce this fact in such abrupt familiar terms, but because he well knew that this was no unusual accident, that he had often seen such fractures of the scull spontaneously cured.

Even deep depressions and very irregular fractures heal, and, what is more rarely to be found, are permitted sometimes to heal, undisturbed: The case of James M'Cartney, a boy of between five and six years of age, is of this nature: "He had a large piece of the parietal bone driven deep in by a stone. A few days after he was stupid, dosing, starting, and vomiting: there was a large tumor and obscure fluctuation on the depression, owing to some ounces of blood below the pericranium; on piercing of which, it sprung out to about a foot's distance. The incision was continued across the depression and fissures: to prevent such exfoliations as often happen, the scalp was *instantly laid close down again*, with soft dossils only in the wound to keep it open. As no

bad symptoms intervened, the fissures being wide enough to allow a passage from within the scull, nothing farther was done but lessening the dossils gradually, till it healed, which happened in a short time, without exfoliation. The hollow is considerable, and will continue for life.*" He is in good health, and at sea.

You will naturally say, What then should we infer from these cases? Are we to do nothing in fractures of the scull? Are the instruments hitherto appropriated to fractures of the scull to be thrown aside? The trepan is not the instrument appropriated to fractures of the scull, but that with which we perforate the bone, when either fracture or any other kind of occasion requires such opening; and of all the motives for using it, that of fracture of the scull is the least frequent: you perforate the scull to let out extravasated blood which oppresses the brain, to open abscesses which could never force its way through such resistance, to raise depression, if you will, but never on account merely of fracture. Allow yourselves but to consider in what fracture of the scull differs from that of any other bone: not in want of circulation in the scull! you have every proof that its circulation is lively and perfect, since the dura mater is detached, the pericranium scraped off, the bone itself bent from its right direction, sometimes raised up, sometimes depressed *, and yet it does not die: you see the integuments coarsely torn off with a stone or a carriage wheel; you see the scull rough, yellow, and apparently void of circulation; you see every threatening appearance of caries, and would believe it dead: Often the wound seems as if a part or the whole would exfoliate, yet in a few days all the naked part of the bone begins to look red; a fine velvet like down of vivid granulations begins to appear in spots and clouds upon the bone; sometimes these granulations are, out of mere wantonness and ignorance, scraped off, but they instantly sprout out again: what becomes of the rima fissure, or fracture, is never observed; it is covered in by this pile of granulation spreading slowly over the bone, and uniting it with the integuments. This process I have seen with admiration, where I could least expect it to take place; in old creatures of ninety years of age, very poor and miserable, and in whom, along with fracture, the integuments had been so mangled as to slough off in flakes. It is just such a delicate pile of granulations that covers the surface of the dura mater, when it appears after the operation through the trepan hole, uniting the dura mater with the integuments

* Hill's Cases, p. 117.

and with the margins of the perforation.—Those who affirm that there is no danger in trepan, affirm of course that there is none in fracture of the scull, for the perforation and the fracture heal by one process, and with an equal pace. If this, which I have observed many times, be the regular and natural process of healing both in the trepanned and in the fractured scull, what apology have we for perforating the scull, and tearing with levers all those parts we think suspicious or perceive to be depressed?

The motives assigned for making large and frequent openings are, in case of simple fracture, to prevent danger; in case of depressed fracture, to raise up the depression; in case of extravasation or abscess, to let out the blood and matter freely. But, are not the smallest openings we can make sufficient to give vent to any suppuration, as the smallest puncture is sufficient for the cure of the largest abscess in any other part? Is it possible, would it be prudent in any case to lay open all that part of the scull under which blood is effused? Though you were to work with your trepan as industriously and unconcernedly as a button-maker, or to trepan as this Henry Chadborn did twenty-seven times, you still would never get to the end of your operation, if the extent of the extravasation were its only limits: I have rarely seen a case of extravasation where the cake of blood did not extend over one entire hemisphere! under a whole parietal bone, and generally down to the basis of the scull, nor an abscess but where much of the surface of the dura mater was coated with pus: I have never had the good fortune to perform or assist at any operation in which it was possible, had we been so extravagant as to design it, to expose the whole coagulum of blood by perforations: In short, what I have observed, is this; that, where, in the case of abscess, we are fortunate enough to be alarmed early, one perforation gives vent to the pus as well to my apprehension as fifty: the matter bubbles out at each systaltic motion or heaving of the brain; nothing prevents it but that fungus or protrusion of the brain, which so frequently happens when the openings are large, that I may almost assure you that, where the openings are made large, they never continue long free, but are plugged up by protusion of the brain. In the case of extravasation, which has no certain limits, I have always been sensible of the folly of trying to lay it all open, for then the limits of our operation could only be the limits of the scull: But after one perforation, when, by the heaving of the brain, the clots have rolled out of the trepan hole, as thick and black as pitch, there succeeds a more fluid blood, the patient often finds instant relief, moves his paralytic side, raises his eyes, and though, without being able to speak, knows his friends; from day to day, the blood by the

natural process of its dissolution, and by a sort of secretion from the surface of the dura mater, is diluted and flows out. The introduction of the probe, often to the extent of six inches in every direction, proves how vain it were to attempt laying open the whole extravasation: the deep introduction of the probe has probably suggested that practice, which is mentioned in books, of making a second and far distant perforation as a counter-opening, but which I cannot approve because I have never seen it necessary: the probe bent and surrounded with a little lint, or a long hair-pencil, is very useful in hooking out the clots, and an injection of tepid milk washes them away. While the coagulum is thus resolving, the dura mater is suppurating and cleansing on its surface; it is at last seen through the trepan hole of a lively red, granulating and bleeding upon the slightest touch: then it comes into close contact with the lower surface of the scull, protrudes with a gentle convexity through the trepan hole: the granulations of the integuments, scull, and dura mater gradually adhere, till the whole becomes one undistinguished granulated surface, where bone cannot be distinguished from flesh. This is the state of matters, (with occasional interruptions and variations,) in the third week, and thus the opening closes and heals. I have often found it necessary, from the strong protrusion of the dura mater into the trepan circle, if not through it, to repress the dura mater at each dressing with the probe wrapt in lint, in order to give exit to the matter or blood *.

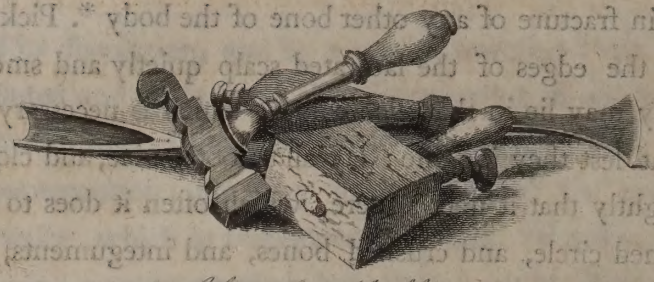
This I can most safely affirm, that wherever I have seen cases of fracture whether simple or depressed, committed not injudiciously nor carelessly to nature, they have done well. Wherever I have found the surgeon impatient to perforate, intent on raising every depressed part of the scull, careful to include in the circle of his saw every suspected piece of bone, and anxious to secure a free evacuation of matter by large openings; I have seen such tearing up of the scull, especially in boys, as I could not witness without pain, uniformly followed by protrusions of the brain and death. In no other part of the body do you open abscess or discharge extravasated blood by large openings; is the brain the only part to be thus roughly treated and exposed to the air, to dressings, and to every thing that is supposed to injure it?

Are we then to do nothing in fracture of the scull?—Nothing I believe which

* In the circumstances here described, some physicians have ordered counter-openings, others have used leaden canulas, grooved or guttered probes, &c. to conduct the matter or blood from under the cranium: I have never found these necessary.

you should not do in fracture of any other bone of the body *. Pick away the fragments of bone, lay the edges of the lacerated scalp quietly and smoothly together, stitch them that they may lie in that nice contact which is necessary to procure adhesion, but not tight lest they inflame: lay all smooth, nice, and close, dressing the wound daily and lightly that it may adhere, which often it does to a miracle, the dura mater, trepanned circle, and crushed bones, and integuments, all consolidating in one firm scar: preserve the patient carefully from every irregularity or excess that might cause inflammation; keeping him quiet, cool, low in diet, and without wine. Be assured that the experience of a Wiseman, and the good sense of Platner are not to be despised: remember what Platner affirms, "Si nulla mala indicia sunt, modioli usus supervacuus est." Adhere to this general maxim announced from such high authority, and it shall be my care to explain every exception so fully as to prevent you, while you avoid the fault of hurry and impatience, running into any fatal error from neglect. You see with what perfect confidence these celebrated men dressed up a fracture, and committed the case to nature, while men of less experience or knowledge would have been busily occupied in scraping every limb of the fracture, and in applying the trepan to each. But they were emboldened by the best of all teachers, experience, to act thus: and whatever prejudices in favour of operation you may carry with you from the school, to this opinion must you return at last. I can safely declare along with O'Haleron that, "in cases of fractures of the scull, long experience has convinced me that many of them require no operation." If there be any exceptions to this rule, it must be when the fracture is accompanied with depression.

* "In fractures of this bone, when you have made way for the relief of the brain, and reduced the broken parts into their places, such of them particularly as are not entirely separate, you are to take care that no more of the said fractured cranium be removed than necessity calls for; at leastwise, any large portion thereof, by which the membranes, and sometimes the brain itself, may be exposed, at least, the cure protracted: For since we see daily that other bones, divided in like manner, are united by mediation of a Callus, nature is as little wanting here, from the broken edges, together with the diploe or marrow interstice, to provide a cement for their coalition, more especially in those we call wounds of the cranium, where large pieces are sometimes divided by a sword or scimiter in close engagements, and have been left adhering to the pericranium and scalp, which, being replaced, and the external wound stitched up, having often been found united as other compound fractures.—*Turner, page* 217."



DISCOURSE II.

ON FRACTURES OF THE SCULL WITH DEPRESSION.

I MUST seem then to have admitted that "depression of the scull oppresses the brain, and requires to be raised up with lever, or cut out with the trephine:" Yet there is no general conclusion I should more unwillingly allow; I should be inclined rather to reject the general rule than qualify it with so many perplexing exceptions as it would in my judgment require: There are many depressions so fixed that no force of instruments could raise them; so extensive, that to cut them out, or loosen and pull away each fragment of bone, would be to open half the cranium, and expose the brain to protrusion, on account of imaginary dangers. Depressions seem many times so alarming to the surgeon, that to raise them, or cut them out, he will use the most unjustifiable violence: yet, though he fails, and the depression remains, the patient, notwithstanding this additional violence, survives: and many times the depression, which has been the subject of such unjustifiable violence, though very conspicuous while the surgeon is labouring to raise it, is really so slight as to vanish even before the wound is closed.

The striving to elevate depressions of the scull, while the patient, far from having any oppression of the brain, is crying with torture, struggling and resisting, though it has been long esteemed the most meritorious work in surgery, is extremely censurable, and has, to my certain conviction, brought many a patient to an untimely grave. "I shall now (says O'Haloran) remark on such fractures as necessarily require the operation in the *first instance*: These are fractures accompanied with depression, with or without wounds: for, not to advert to the *restraint* such pressure must necessarily cause to the motion of the brain, *sufficient*

in itself to produce fatal effects, &c." This is affirming, in its utmost latitude, that very mistake on which all the bloody doings of past and present ages are to be attributed. "If a single operation (says Warner) be insufficient (as I have often known it to be) to effect the elevation of the depressed bone, a second and a third must be performed, that the surgeon may be enabled to *raise up every part of the depresed bone*; which *rule* must be *strictly observed*, otherwise the operation cannot be expected to be attended with success, as the *bad effects of the oppressed brain* must remain." In every elementary book you read the same language, and from every lecturer hear the same general conclusion; for, in describing the scull, he assigns depression of it and its fractured part intruding upon the brain, as the principal occasion for using the trepan.

This passion for leaving nothing undone will naturally glide into your minds; for the prejudice of every profession is in favour of what its art can accomplish, and in ours this bias is peculiarly strong: trepaning fractures, raising depressions, and making ample openings for blood or matter, are the surgeon's chief pride. But I cannot help recollecting the droll expression of Permanmus, who says, or his translator for him, "There are many persons who fondly imagine that boring a hole in the scull is an easy matter, and to be done at any time, whereas it requires *mature consideration*, a very *able head*, and a skilful hand to undertake it *."

Aware of the deceptions to which you are exposed, I should feel myself much to blame did I neglect to warn you of them. You will say within yourselves, "Though it is plainly our duty, and is most natural, to leave a mere incision or wound, although it affect the scull itself, untouched and but lightly dressed, since we know that wounded bone will reunite with the soft scalp; though it be equally natural and right to treat a compound fracture of the cranium, even where it is much shattered, like a compound fracture of a limb, by picking away the loose bones, cleansing the wound, composing the soft parts, and laying all smooth and close; is it equally natural or proper to leave unreduced a depressed portion of the cranium, which cannot but press upon the brain?" "Surely, (you would say), the visible depression of a piece of the scull must be an oppression to the sensorium, of the worst and most dangerous nature, because it is sudden or rather instantaneous, and because it is produced by a firm and solid body: blood and matter being fluid, may

* Page 15.

be absorbed, and thus time may lessen that kind of pressure; but what can remove the compression of a firm and solid bone? Are we to remain, you would be inclined to ask, unconcerned spectators, whilst our patient labours under a visible depression of the cranium?"—These are real difficulties, and must be answered; and facts will hardly persuade you when balanced against such strong probabilities: but the whole question shall be fairly laid before you; it is one of those which I stand pledged to discuss with soberness and deliberation; it is one in which you must learn to decide on sure principles, since you are about to enter on that scene where responsibility rests on each of you, where you must trust to your natural reason, not to the dogmas of any teacher, and suit your practice to the various exigencies of each case.

There is a wide difference, in theory and in fact, betwixt the oppression proceeding from extravasated blood, and that from depressed bone. It is because bone is firm and immoveable that its depression does no harm! for the pressure it causes is permanent, not progressive; it is fixed and complete at once: if the patient be not struck insensible the moment the bone is beaten below its level, he never can become so; and you will find, by a singular variety of proofs, which I am now to lay before you, that he seldom becomes insensible. The brain is capable of accommodating itself to any degree of pressure which is fixed and stationary, and that arising from a depression of the scull is so slight that it can hardly be estimated; for the depressed portion is a very small segment of a large circle: the broadest depression possible is not equal to one-tenth of the whole convexity of the cranium. The smallest deviation from a circle seems very great, and that depression which is very visible outwardly makes no sensible impression within: the depressed portion of the cranium is so little off its level, that it merely exposes a rough and rising edge, never exceeding the whole thickness of the bone: the fractured and depressed portion dips only at the line of fracture, and declines very gradually from the line where it is level with the scull to the line of its greatest depression: a depression even of three inches long, of the parietal bone, for example, (Vide (*a*) figure 1. of fractured sculls) declining gradually for two inches, and terminating in a depression of the depth of a fifth of an inch, (i. e. the full thickness of the most substantial scull), must produce an abridgement of its cavity inconceivably small, as is marked and demonstrated by the dotted line (*c*. fig. 1.)

The slight effect that could, in the worst depressions, be produced by intrusion of the bone, would be to exclude from the regular circulation within the head a very

trivial proportion of blood: indeed I know not whether the slightest fit of coughing would not both affect the function and endanger the structure of the brain, more than the deepest depression I have ever chanced to see. It is, on the contrary, because blood is soft and fluid that it has all the effects of a solid body, and that its pressure is irresistible: the effusion is not instantaneous but slow; every time the brain subsides, i. e. at each respiration, more blood exudes from the ruptured vessels; it is injected betwixt the scull and dura mater by the force of the circulation: this internal haemorrhagy is probably not complete at first, but is renewed in paroxysms; it is not limited to one spot, but is diffused over the whole hemisphere of the brain: the extravasated blood has, by accumulating and coagulating, all the effect of a solid body; nay more, as it increases in quantity, in proportion as the brain yields, it acts with the force of a wedge, which presses harder the deeper it is driven. Such is the difference betwixt the injection of soft blood within the firm cranium and depression of the scull.

But these are only arguments, which you dare not trust to; you must have proofs more relevant than this; and the facts I have to display are really singular. It having once become an acknowledged maxim, that the surgeon should trepan every fracture and elevate every slight depression, no one having any opportunity of seeing, a pure case of depression where the surgeon had not been busy, it might eventually have been very difficult to prove that it is safe to leave such fracture untouched. But a thousand favourable accidents have betrayed the iniquities of this rash practice, and proved, in various ways, that the surgeon has been usually occupied, and often with extreme violence, in elevating fractures which had been better left alone: Sometimes, in the hurry and confusion of such a bloody scene, a remarkable depression of the scull has escaped investigation, the patient has escaped the violence and dangers of an operation, and the surgeon has been sensible of the deep depression only by feeling it through the scalp when the man was well: Sometimes relations and friends have interposed and prevented the well-intended operations of the surgeon, who has protested against leaving a great depression unreduced, and prognosticated death, yet the patient has recovered: Sometimes, the surgeon having leave to do his work, having made his perforations and pushed in his levers, has found the depression too deep and too firm to be raised; after every justifiable and every unjustifiable violence, he has been unable to raise the depression, and has not dared to cut it out; he has left the patient in this desperate state, and yet seen him recover after such violence, added to the deep depression: Sometimes when, from the foul air of hospitals, or the prevalence of

epidemic diseases, the surgeon has been deterred from his favourite work, he has discovered, with equal pleasure and surprise, that " more recover (to use the words of Perusinus) by medicines than by the knife and the saw *." Indeed, the conclusion against the profession and its general propensity to operate, in mere injuries of the scull, is stronger than I believe you are aware. I know that if you had seen along with me the precipitation and violence with which depressions of the scull are torn up, and the miserable consequences arising from large openings, both your reason and your feelings would revolt against the practice.

" I chanced once (says Platner †) to be called to the assistance of one who had fallen from the third storey of a house, and lay quite torpid and oppressed as in a deep sleep. The surgeon, having shaved his head, found there a very deep and wide depression of the scull. While we were wondering how the scull could be thus deeply impressed by the fall, the integuments being but slightly ruffled, the man recovered his senses in a fortunate hour; alarmed at the proposal of an operation, he told us that the impression we had observed was of no importance; he had it from his childhood; and yet had lived in perfect health: he recovered without assistance." We are at a loss to conceive how, even where the integuments remain entire, so wide a fracture and so much depressed, can be consolidated without any ill symptoms; but several cases which I have myself witnessed make the process quite familiar to me: and one related by Botallus I think particularly worthy of your notice: ' Some (says Botallus) will very readily acknowledge that bones, fractured without an external wound, are easily cured in other parts of the body, while they deny the bones of the scull to be thus cured: I will relate plainly what I have myself seen. While I practised surgery, a boy, as I guess about seven years of age, fell from a gallery twelve feet high, and pitched directly upon his head: The parietal and part of the frontal bones were so fractured that you could feel distinctly the several fractured pieces, yet the skin (he having fallen upon a flat pavement) was not wounded, nor even the hair ruffled. When called, I was altogether confounded at finding such a fracture, the boy speaking and in his perfect senses, with only a slight acceleration of pulse, (he was however in-

* " Jacobus Perusinus Romae celleberimus atque optimus nostri saeculi chirurgus, mihi refert, se longo usu observasse, *magis servari eos qui citra scalpelli operam* partim lenientibus partim siccantibus curantur, quam quibus cutis inciditur et os aperitur."—*Vidi Vidii Opera.*

† § 557. b.

sensible at first, and had vomited up his dinner along with some bile) a thousand thoughts passed across my mind, while those I had sent to the apothecary's were returning with some medicines. I was for some time irresolute whether to make an incision and pick away the fractured bones, or to leave the parts entire: at last I resolved on this more lenient plan. In place of making an incision, I covered the whole head with Armenian Bole, Myrtle Berries, and Rose Leaves, mixed with vinegar and white of eggs; and this astringent application I used during four days. The boy perfectly recovered without incision; he lived many years; and, though I do not recollect his name, I have reason to believe he is still alive *."

This ingenuous avowal of Botallus, that he was altogether confounded at feeling such a fracture, and that a thousand thoughts had fleeted across his mind, makes the case highly interesting: we are conscious, from the conclusion of the case, how dangerous these thoughts were to the patient, and must feel that when they present themselves to our imagination they should be resisted; had he yielded to those very natural fears, and made incisions to pick away the bones, I doubt not the boy would have been lost.

Parents have often with seeming perverseness refused assistance in the last extremity, and even the earnestness with which it is offered is a motive for refusing it; despair makes them unwilling to disturb the last moments of their child, which, being left undisturbed, recovers; what the fate of such a child might be if trepanned, must ever remain doubtful.

I was called once to a child, whose circumstances seemed so very desperate that I urged the parents to allow of an operation, which fortunately they refused. "This little girl, about twelve years of age, was playiug with her school companions on the very steep declivity of the Earthen Mound: two of them were running, hand in hand, when this little girl, losing the hand of her play-fellow, rolled from top to bottom of the Mound, with continually increasing velocity, till at last she pitched with her head full against a low wall, at some distance beyond the bottom. She was carried home in a chair, stiff and motionless, perfectly pale, and without pulse; she hardly breathed; and we had no evidence of her being alive but a slight degree of warmth, which, after cutting off her clothes, (for she was stiff as well as motionless) was difficultly increased to a natural warmth.

"From this time she lay in a deadly stupor, with a blemish on one temple; there was no tumor, but flat integuments, through which I imagined I could feel a fracture and

* Page 725.

depression of the parietal bone, while the signs of accompanying extravasation seemed very unequivocal: her limbs were stiffened; her whole frame in a sort of tonic or permanent convulsion: her jaws firmly and immoveably locked; her extremities cold, and her pulse oppressed and intermitting. In this state she lay for four or five days immoveable; hardly was a tea-spoonful of wine and water admitted betwixt her teeth, which were firmly and immoveably closed. I was then persuaded, and remain so, though she happily recovered, that there was extravasation under the parietal bone; and my persuasion was so great that, on the fourth and fifth days, I solicited her parents to allow of an incision, and even spoke to the clergyman, who was called to them at this dismal time, to persuade them to consent. On the sixth day she yawned widely, and from that moment her jaws were loosened: we could now put in a few spoonfuls of wine and water, and give purgative medicines; but she lay still and dead, in the most profound stupor I ever witnessed. She began in the second week to stir the limbs of one side a little, and in two days more she stirred sometimes an arm, sometimes a leg, of the opposite side: then her eyes opened at times, and she began to mutter and speak; but it was the fifteenth day before this low muttering came on; and then, and till the twentieth, though her eyes were open, we had unquestionable evidence that she could not see; a candle approached to the eye gave no sensation, the eye did not follow it, nor were the eye-lids closed as expressive of impatience of light, and the pupil was as much dilated as if she had lain in a dark place.

"She now became restless, the struggling of the limbs of both sides increased, she put out her hands and stretched her limbs with a sort of trembling, and muttered perpetually. On the fourth week, she came to swallow more easily, to take the drink which had hitherto been poured into her mouth, and to speak rationally. She next sat up in bed, was raised into a chair, and gradually recovered her senses and her strength. She was then able to be led about the room, but two months elapsed before she could be said to walk: even then she was never left alone, nor walked unsupported. She was led about the whole summer in this weakly condition; but is now a strong and healthy girl."

"That excellent chirurgeon, Arnoldus Tholinx and myself (says Ruinhuisen) were consulted about the child of a Sea-Captain, which had fallen from the upper-deck of the ship to the bottom thereof, being the height of eleven or twelve feet: and here the trepan being judged necessary upon the dangerous accident's ensuing,

and by us proposed as such to the parents of the child, but by them refused; we employed nothing but convenient fomentations, and proper ointments, and the like; by which means the child was happily recovered to the great instruction of myself and the benefit of others *."

That you may have every kind of benefit from such ingenuous communications, I shall represent to you one or two scenes on the best authority. " Mr Avellan † relates the case of a little girl fourteen years of age, who, after a blow on the head, faintings, vomiting, and delirium, from a depression of the right parietal bone, lay in an oppressed state. Her condition plainly required the trepan, which yet her mother pointedly refused. The faintings and delirium continued no less than three months, the girl remaining in a state of idiotism or silliness; but, in process of time, the depression vanished, and the symptoms entirely disappeared ‡."—" A little girl, (says Marchetti) a child of the house of Ridi, having fallen over the stairs, and struck the occiput against a stone step, had a conspicuous depression of the scull, but without any laceration of the scalp: the parents refusing to hear of incisions or other operations esteemed so necessary in cases of this nature, medicines alone were applied for abating the inflammation, and the child, opposite to the belief of all

* Ruinhysen, page 153. † Academei de Chirurgie, tom. i. &c.

‡ At other times various accidents have prevented these operations which the surgeons believed to be essential to the recovery of the child: witness the case in the academy memoirs which immediately succeeds this. " A child of ten years old fell from a height of thirteen or fourteen feet; tumors immediately rose on each side of the head, on its upper part, covering partly the frontal partly the parietal bones, longer than two eggs. The surgeon opened the tumors; found each parietal bone naked to the extent of an inch or more. On the left side, the fracture and depression were so deep and gaping that a spatula was easily passed betwixt the depressed brain and the scull: while the coronal suture was separated, so that you could introduce a probe into it: Both the depression and a manifest effusion of blood upon the dura mater, required the trepan; and though it was resolved on, it was by some accident deferred, became unnecessary, the blood flowed through the fractures, the depression rose of its own accord, and all the symptoms vanished."

L'enfoncement des os et un épanchement qui s'etoit fait sur la dure-mere, exigeoient le trépan: on s'y determina même d'abord, cependant il fut différé, et par ce delay l'opération devint inutile. L'écartement, joint à la situation que M. Duprey donna au malade, procura vers le cinquiéme jour *une issue au sang extravasé, l'os se releva ensuite de lui-même, et tous les symptomes disparurent.*

the medical attendants, was perfectly cured, not without a conspicuous depression remaining; she is married, has a family, and still survives in perfect health *."

Perhaps there is no rule in surgery more correct in theory, nor better supported by authority, than that which warns the surgeon to beware of being too busy in raising the depressions of the sculls of boys; perhaps a strong conviction of this was among the motives which induced Hildanus to speak of so many idle and puerile inventions for *sucking up* depressions of the scull, for he declares, in the most express terms, against using instruments, saying, " Puerorum Calvaria ex casu deprimi posse nullis supervenientibus symptomatis †. Scultetus, in place of labouring with instruments to raise the depression, wraps the boy in a warm sheep's skin :‡ And Turner, a man of observation and strong good sense, says, " where there is a depression of the cranium, provided it be small, like the superficial dent in some pewter pots, the patient young, with convulsions, delirium, stupidity, or other mischievous symptoms attending, *you must not* presently go *to work with your instruments*, but treat the case as a contusion §. " A gentlewoman, (says Turner) very nearly related to myself, has the most considerable impression of this kind, occasioned by a fall in her infancy, that I ever met with, *there being room to hide a finger in the dent*, on the back part of the head ‖."

No other proofs need be required, since, always when by chance these depressions escape the busy inquiries of the surgeon, the patient is saved; were any such proofs required, we might find them in the early work of the good old surgeon Berengarius, who says, " Not only in childhood, but in various ages, have I seen great depressions, and conspicuous cavities, with very remarkable fracture, cured, without any ill symptoms, by plasters alone: I have, at this very hour, a boy under cure, having his scull depressed, the depression most remarkable, without one ill symptom **."

* " A natura fuit sanata superstite tamen insigni depressione ossis."

† Page 83.

‡ In depressionibus puerorum, sine rima et laevis accidentibus, ab omni chirurgia abstineo, et pellem agni callidam exhibea rasis capillis, &c. Vide Scultetus, p. 111.

§ Page 213. ‖ Page 214.

** " Ego tamen vidi compressionem magnam et notabilem, in alia aetate quam in pueritia, absque fracturâ ossis manifesta, et non erat rupta cutis, erat tamen concavitas in capite notabilis, et per emplastra sanati sunt, et non fuere mala accidentia aliqua. Nunc quoque habeo puerum unum in cura cui os est depressum depressione magna, et nullum est malum accidens.

The practice of those who believe it to be their duty to scrape every fissure, and raise every depression, who are ever ready *to go to work with their instruments*, affords the most fatal and melancholy proofs of the improvidence of such practice; and we find practical errors narrated, by the best modern surgeons, with a non-chalence, and want of consciousness, altogether astonishing. " I cured a boy (says Marchetti) of seven years of age, who, from the kick of a horse in the forehead, had a very remarkable depression, which neither tripod nor lever could any way elevate; but there being a fissure in one part, I betook myself to the rugin, dilated the fissure, so that the serous humour had leave to exude, while the medicines had leave on the other hand to penetrate to the dura mater, so that in the course of forty days, flesh being regenerated in the fracture, the wound was safely and soundly cured*." But, had the celebrated Marchetti been permitted (as it was a wonder his authority did not prevail) to trepan this little boy, to tear up the scull with his tripods and levators, it is possible at least, that even after such violence, he might have survived, and then the operation and the operator would have been applauded for saving the patient's life; and had the elevation of the bone been accomplished, though with every circumstance of violence and rudeness, the operation would have become memorable. Such a case is that recorded by Mr O'Haloran, in which every principle of sound surgery was violated. He found a child with a depression of the scull with the integuments entire, and the senses quite composed and perfect, when, without any motive but his own unmeaning fears, he, in opposition to every good authority, cut open the scalp; and that depression, which had hitherto done no harm to the child, he elevated in the rudest and most shocking manner, making no fewer than four perforations in the scull of the child, thrusting into each hole a levator, and to his four levators he had two surgeons, who seem to have had as little tenderness as himself, for they pulled with might and main, till the depressed bone rose with a sudden spring. But here is his own narrative.

" A girl, *about seven years of age*, received *a severe fracture, with profound depression*, on the left parietal bone; *the integuments were entire, the girl quite com-*

* " Curavi puerum septem annorum, cui in fronte ab ictu pedis equini facta fuit insignis ejus depressio, quam nec triploide, nec vecte attollere potui. Verum quia in quadam ejusdem parte aderat rima, scalpro abrasorio eam dilatavi, ex qua aliquae serositates emanabant, ut medicamenta ad membranam usque pervaderent," &c.

posed and sensible, but the depression was so deep that it could contain a very small egg. Such was her situation when brought to me half an hour after the injury. Seeing that it would require three or four crowns of the trephine to raise this extended fracture, I requested of Mr Wallace, a military surgeon, and Mr Pierce, to assist me in this charitable work. I removed all the integuments, wiped away the blood, and whilst these gentlemen with their fingers made compression over the bleeding vessels, I began to operate on the inferior parts of the bone. I then commenced a second on the upper part, and in a line with this; but two elevators, though acting at the same time, had no effect on the depression. Two more crowns were then applied to the sides of the bone, and parallel to each other. *Four levers acting in conjunction, it astonished me to see with what a sudden spring the depressed parts resumed their former station.* Notwithstanding the great extension of this fracture, the loss of covering, and of the bone itself, by four crowns of the trephine, this girl never after had the smallest untoward symptom."

Is it by such narratives and such proceedings that the good repute of surgery is to be preserved? by no means: We should at first sight be inclined, both from the violence used in raising this depression, and from the success of the operation, to ascribe the patient's safety to the intrepidity of the surgeon; but what should we have said of Mr O'Haloran's practice had he miscarried, and been unable, with his military assistants, his pair of surgeons and double pair of levators, to raise the depression, and yet the patient, after all kinds of violence being added to the depression, had lived? There is not in the narrative of this case any shadow of proof that the patient was saved by this mode of operation: the child was composed and sensible, had no bad symptoms, and would have had none to the very end of the cure, had she been left alone: it proves merely what is but too surely true, that often the patient survives the most imprudent things the surgeon can do.

I will now produce you evidence that I put no worse construction upon this case than it should bear: It will prove to you, that, even where the depression is broad and deep, where convulsions have ensued, where the surgeon, alarmed at these signs of danger, has made his incisions and his perforations, and tried ineffectually to raise the depression, the patient has survived both the depression and the ineffectual operation, which must ever be a violent one. Mr Hill undertook, in an unfortunate hour, the following operation. " A boy of the name of Carson, between five and six

years of age, by the kick of a horse, had a *long piece of the os frontis beat in flat*: He slept sound, as the people termed it, about two hours, and then fell into strong convulsions. The extravasation was so great externally, that the precise quantity of the bone depressed could not be determined, till the blood was discharged by a horizontal incision along the depression, by which I discovered it to be *of an elliptical form, extending above two inches across the forehead, and above the right sinus frontalis*, with a fissure all round it. The external discharge not relieving him, showed that the perforation would be necessary; and, therefore, after allowing the first incision to bleed some ounces, it was stopped by dry dossils. Being determined, for the reasons formerly given, not to touch the depressed part, unless some symptoms should afterwards make it necessary, I continued the incision till there was room for perforating a quarter of an inch from the fissure, at the right end of the depression. The bleeding was troublesome; but no arteries required to be stitched, but were stopped by dossils dipt in ardent spirits, and applied for half an hour. After which, just as much of the pericranium was removed as was necessary to admit the smallest head of the trepan.—The connecting blood-vessels betwixt the dura mater and scull were broken through the whole extent of the depression, being at least two inches; *for so far I introduced the levator, without opposition, and attempted, with a good deal of force, to raise it; but in vain.*—After the extravasated blood was discharged, *three intersected stitches were put into the first incision above the depression, and it united in a few days*; and the rest of the skin healed in four weeks, without the intervention of any bad symptom.—He is well, 1771; and the depression, owing to his youth, is so expanded by natural growth and the callus, as not to be much perceived."

If any thing could repress the presumption of a man of an adventurous temper, this must: To propose an operation under protest, that it was the only possible means to save the patient's life: to attempt that operation: to see the patient survive the depression, which had been declared fatal, unhurt by the additional violence of incisions, trepans, and levers! Surely these facts should lead the surgeon, who had been in the habit of elevating inexorably every slight depression, into a new train of thought.

The prominent points of this case of Mr Hill's stand, in common sense and plain argument, thus: First, The depression, while it continues, does no harm, the boy being in his entire senses: Second, The surgeon is so alarmed at the very

appearance of depression, that he labours with every degree of violence to raise it, his own reputation, as well as the patient's health, seeming to be at stake: Thirdly, Abandoning the operation, and leaving the depression as he found it, he puts three stitches in the wound, and so the integuments unite over the depression in a few days: Fourthly, The patient is no sooner recovered, and the wound healed, than the depression, which appeared so formidable to the surgeon when seen and felt at the bottom of a bloody wound, the depression, to raise which he willingly risked every thing, disappears spontaneously, so little is it off the level*.

It is from no petulant desire to injure the reputation, or criticise the practice, of a man so justly valued by his profession as O'Haloran; there are, in the works of some modern writers, absurdities which no one will condescend to criticise: every necessary criticism of his practice is in truth a compliment to his authority, which is such that I would not willingly leave unrefuted any thing in his writings that seems to me dangerous.

" Patrick Casey (says Mr O'Haloran) was thrown from his horse, with great force: the consequence was, fracture in part of the coronal bone, with great depression. I was requested, next morning, to visit him; and, seeing his condition, I was just proceeding to the operation, when a surgeon of the city appeared, who said he was employed by Casey's master to attend him. The depression was so considerable, that the lower edge of the fracture was beaten under the injured part; here I intended my operation, in order the more speedily and effectually to disengage the fracture: But this was opposed; it was observed, that trepanning so low down would leave a great deformity, and that the end proposed would be as well answered by perforating the bone at top. I opposed it in vain: I saw that the friends of the boy who were present, as well as himself, wished to have it done so. *I trepanned, introduced the levator, but could make no impression, as*

* These are not solitary, nor even rare cases. Read the following from Mr Hill. " February 24. 1750. Mr Robert Rae, when a young man, fell backward from his horse on a rock, about twelve miles from Dumfries. By his foot sticking in the stirrup, he was dragged some way, till the girth broke, and left him with his head betwixt two stones in a rill of water, where he would soon have been suffocated had not a shepherd boy drawn him out.—A large piece of the left parietal bone was driven in backward to the lambdoid suture, with a fissure in the right parietal forward, being like a shepherd's crook: notwithstanding the larger depression, there was no extravasation; *nor would the bones rise, though a very great force was employed*; but they exfoliated like the former, and, the aperture being wider, the protrusion was greater. The cicatrix continued soft for three years, when it ossified completely.

the depressed parts were beyond the reach of the instrument. I now proposed a second opening on the lower edge of the fracture, the first being impossible to answer the end proposed. This was not agreed to. It was observed, that an opening being made, no deposit could be formed, and that the depressed part would become gradually detached, and probably come away, which has sometimes happened. The sore was carefully dressed, but the dura mater never assumed a right aspect; *however his spirits were good, and he had no complaint but what arose from the sore itself.* The discoloration of the dura mater *made me try, on the 15th, and again on the 17th, the effects of the elevator, but in vain!!* He was up every day. The 24th, looking out of a window for some time, he perceived a slight chilliness; at bed time he grew hot and feverish, was very restless, and had a strong shaking fit. This alteration was ascribed to his making too free with himself. But I saw and dreaded the consequences. I told the people that these alarming symptoms proceeded not from cold, *but from the constant and uniform pressure of the brain; and that if any chance remained for his recovery, which I much doubted,* it must be by a speedy removal of the cause; and if they consented, I would not shrink from this disagreeable business. *I directly made the second perforation, and soon raised the part*; but, alas! the mischief had been already completed. That day and the next he seemed a good deal lighter: but, about ten at night of the second day, his neck was observed to be covered by a bloody ichor issuing from the sore. Next morning his pulse was more languid, and the dura mater quite black. Towards night the bloody ichor increased; he became slightly convulsed with stupor. About ten the substance of the brain poured forth, and he expired next morning."

This case reminds me of the circumstances of an operation in which I was a party; where, although I was obliged to be a witness and unwilling assistant in much mangling, I saved the man a great deal more. There was, along with a wide fracture of the parietal bone, through which the extravasated blood was seen, a slight depression of it at one corner of the fracture: the trepan was applied: the extravasated blood rolled out: the duty of the surgeon was, according to my apprehension, completely fulfilled; but he was urged by others who were present to raise this depression, with a degree of earnestness which left him entirely responsible for the consequences. I most unwillingly witnessed, but would not consent to assist in this part of the operation. After extreme violence (for

always the violence is extreme where the surgeon works till he is foiled) it was found altogether impossible to elevate the depressed bone. The operator was now called upon, under the same responsibility, to make one, or, if necessary, two perforations, on the sides of the depressed portion, to raise it. I saw plainly that, if the operation, now protracted for an hour, should continue still another hour, the man would be carried off delirious; that if the scull was widely opened by two perforations, and by the tearing away the depressed bone, his chance for life was very slight. I said across to the surgeon, that if he would permit me, I should most willingly take the responsibility upon myself. On his consent, I put aside the busy fingers that were searching for depressions, clapped a piece of lint on the dura mater, and conveyed him to bed, where he mended daily, and became a very stout and healthy man.

Mr O'Haloran seems willing to vindicate himself, and is quite unconscious of the indecency of such repeated operations: he says, "but, alas! the mischief was already completed;" an expression neither delicate nor modest at the conclusion of a case where every kind of violence had been committed. A boy was trepanned, while in his perfect senses, in spite of his own remonstrances and those of his friends, this only choice being left him, viz. whether he would be trepanned at *the top of his head or at the bottom.* Very wide indeed is the difference betwixt a case thus tortured with frequent and partial operations, from that depression in which the integuments are laid nicely upon it, and the case committed to nature. A perforation was made, the levator used in vain, the dura mater first hurt perhaps by the depression, then injured by every kind of tampering, began to inflame; yet his spirits continued unabated; he had no complaint. Mr O'Haloran, perpetually watching the aspect of the sore, imagining the dura mater discoloured, first on the fifteenth, and again on the seventeenth, introduces his levator, and persists in poising up the depressed part: Still the boy's health continues good; he is daily out of bed: on the 24th, he is at the window, takes cold, and has rigors. Then a new perforation is made; the depression is forcibly raised; and the patient dies on the third day after. Far from wondering at the fate of this patient, I can safely say I have often seen such doings, and never yet saw the patient survive. Indeed this is the very case to illustrate a rule to which I solicit your attention. "Whatever you do, do with that kind of decision which may entitle you to success. If you resolve not to operate, then, after picking away the fragments, and dressing the wound softly and gently, commit the

case wholly to nature. If you are to operate, do all that you have to do at once, nor think of changing your mind with every variation of the symptoms, renewing your trepannings and using the lever at the very moment when inflammation is threatened."

Is it not mortifying, that the operation, on which the surgeon values himself so much, should be thus doubtful: That, when he has, with the usual eagerness to raise depressions, used every justifiable and every unjustifiable violence in vain, the patient lives in spite of the depression! in spite of his operation! This is a sad deception to which we are exposed: we are probably assuming to ourselves the merit of having saved those by our operations, whom we have only not destroyed, and such, perhaps, are all our boasted cures: that which is thus proved in a few cases may be suspected in many; for though there are not many in our profession who have had the strength of mind to commit such cures to nature, whenever, by inevitable causes, we are compelled to suspend our designs, nature atchieves the cure.

The bloody decrees of the surgeon against all who have depression of the scull are never so absolutely suspended, as where the ill constitution of the air in a great hospital is known, by the experience of centuries, to destroy all those who suffer operations on the head. Under this imperious necessity was Dessault, surgeon of the Hotel Dieu, who, during his administration, declined, even in the most urgent circumstances, to perform the operation of trepan, and found in the end how true the maxim is which I have just quoted from Perusinus the Roman surgeon: "Magis servari eos qui citra scalpelli operam curantur, quam quibus cutis inciditur et os aperitur."

Dessault's clinical practice, when he merely allowed the patients to lie undisturbed and quiet, with a poultice to the fractured and depressed scull, and a dose of calomel to move the bowels, exhibits a splendid series of examples of what nature, *undisturbed* by partial operations, will do; and taught Dessault himself, and proved to the profession, how great a proportion of those who are trepanned would live without the help of surgery: for many recovered after lying long in a state of stupor, accompanied with symptoms every way alarming, such as would, in any other circumstances, have induced Dessault or any surgeon to have trepanned.

But Dessault, who was too much inured to bloody scenes to fear operating, and too indifferent to the reputation of being an operator to feel any thing of the passion for cutting and trepanning, tried, for the first time, the great and important experiment of leaving his patients, having fractures and depressions of the cranium, at quiet in their beds. Among others, one Joseph Gautier's condition was in every sense interesting, but especially in the slow absorption of that general suffusion of blood, which we must presume to have taken place in the brain after so violent a concussion as he seems to have suffered, and the gradual recovery of his senses, proportioned in all likelihood to that absorption, and accompanying it step by step. "Joseph Guatier, a hale young man, twenty-three years of age, was found in the morning under a window, which he was accustomed to scale when late abroad, lying in a state of stupor, and bathed in his blood, which streamed from his mouth and nostrils, and from his left ear. When he was brought from his village, a few miles distant from Paris, into the Hotel Dieu, he was still bleeding from the mouth and nostrils, and insensible; the body cold, the face deadly pale, and the pulse small and contracted. On his head were many marks of contusion; and one over the lower and fore part of the parietal bone, was accompanied with a depression, deep in the center, and rising towards each side. The clavicle, which was also fractured, being set and bandaged, the head was wrapped in a large poultice: next day he was better; the poultice was continued, and he was bled in the foot; and in the evening his senses in some degree returned. On the sixth, he began to articulate, but indistinctly. By the seventh his senses were restored; his taste, smell, and touch were perfect, but his vision somewhat impaired: he heard also imperfectly; and, in respect to his intellect, the faculty of memory seemed much weakened; he could by no means recollect whence he came. He had no pain: it was on the tenth day that he first rose and walked: On the fourteenth, he walked abroad upon the bridge, and took his airing there daily, till the twentieth, when, the fractured clavicle being re-united, the bandages were undone. His memory mended daily; his hearing became more acute; his eyes gained strength, but still the pupils remained dilated somewhat wider than in the natural state, and the scull remained manifestly depressed. On the twenty-seventh, he was carried into the hall at lecture, and shewn to the pupils; this was before he was dismissed. At the end of three weeks, he returned to show himself, his senses being entirely restored, and his memory per-

fect: the pupils of his eyes had recovered nearly their natural smallness, except that the pupil of the left eye continued a little wider.

In this case, when about the third day, the bumpy swelling and ecchymosis began to subside, they felt the fracture and depression very distinctly, the fracture being of a circular form, about two inches and a half in diameter, with one edge more raised than the other; and after his recovery it was still more plainly felt.

" * The invariably fatal consequences of using the trepan in the Hotel Dieu deterred Mr Dessault from using it on this occasion; nor had he any reason to repent of his resolution." Even when the depression seems to produce the worst signs; when the patient bleeds from the nose and ears, and lies insensible; when his senses are not merely stunned and shocked, but so materially injured that they recover slowly, it is safe to leave the depression untouched: to trepan where there are no such signs would be destruction. Mr Abernethy " had a man brought to St Bartholomew's, who was hit on the forehead with a brick: The frontal bone was fractured half an inch above the orbit; the fracture measured two inches in length, and the upper portion of the brow was depressed about the eighth of an inch. *He was not even stunned by the blow, and walked to the hospital without assistance*, complaining only of soreness in the wounded integuments. He was bled; was confined, much against his inclination, to a scanty and liquid diet, and was purged every second day. This patient did not experience any illness, and the wound soon healed." But had Mr Abernethy been a surgeon of the complexion I have sometimes ventured to describe; had the patient been confined, much against his inclination, *to an operation-table*, and *trepanned*, there is little doubt I think how it would have fared with him.

But this is the difference betwixt the proceedings of a man of sense and experience, and a man of theory. There has been too much of surgery! A master in surgery can look, calmly and composedly, on that depression upon which a novice would instantly fasten his levers; he can see the scalp whirled off from both

* Journal de Chirurgie, tom. 1. p. 20.

sides of the scull * ; the parietal bones laid bare ; the temporal and frontal bones also denuded ; *part of one of the bones beaten in, for an inch in length*, and more than the eight of an inch in depth, and a fracture extending downwards to the basis of the scull,—and yet refrain from trepanning. He can see a fracture similar to this, with a part of the bone depressed *even a quarter of an inch below its natural level*, without thinking of making an effort to raise it ; and can even see the boy sicken on the third day, with headache and disturbed sleep, with dozing and

* " A lad, seventeen years of age, had his head pressed between a cart-wheel and a post ; by which accident the scalp on both sides was turned downwards, so as to expose the lower half of the parietal bones, the squamous part of the temporal, and also part of the frontal and occipital bones ; about a quarter of the cranium being thus denuded of its coverings. The periosteum was in several places stript off from the scull, the scalp much bruised, *and the posterior and inferior angle of the left parietal bone was beaten in.* The depressed portion, which was visible, *was an inch in length, and more than the eighth of an inch below the level of the cranium* ; but the fracture extended along the squamous part of the temporal bone, towards the basis of the skull : it could not, however, be traced, as the temporal muscle had not been removed from that part by the injury. The scalp being cleansed, was replaced, retained in its situation by slips of sticking-plaster, and a slight pressure by bandage was applied. *The boy was perfectly sensible, his pulse regular, and not quickened.* He had bled considerably from the temporal artery, which had been divided by the accident : eight ounces of blood were, however, taken from his arm ; and some purging medicine was administered next morning, which procured three or four stools. The next day (Friday) his pulse beat nearly 120 in a minute ; his skin was hot and dry ; and he complained of pain in his forehead. Twelve ounces of blood were taken away, and four grains of pulvis antimonialis ordered to be given three times a day. On Saturday, the former symptoms still continued, and were rather increased. The antimonial powder made him sick, or at least increased his disposition to be so. Fourteen ounces more of blood were taken from him ; the vibratory feel of his pulse not being altered until that quantity was taken away : the blood, on standing, appeared very buffy. His skin, notwithstanding all this, still remained extremely dry ; some antimonial wine was given, which produced vomiting. On Sunday, his pulse was evidently lowered by the evacuations he had undergone, but it was still quick, and sufficiently strong. The pain of his head remained as before. Having a sufficient number of stools, and the sickness still continuing, the antimonial powder was omitted. He was bled, however, in the vena saphena, and his feet and legs afterwards immersed in warm water ; during which, he, for the first time, perspired copiously. A blister was also applied to his neck.—The scalp united, with only a trifling suppuration over the fractured part of the bone ; and to this ready union, the lowering plan, by preventing inflammation, seems very materially to have contributed. The matter collected over the fracture was discharged by a puncture, and the boy got well.—*Abernethy.*

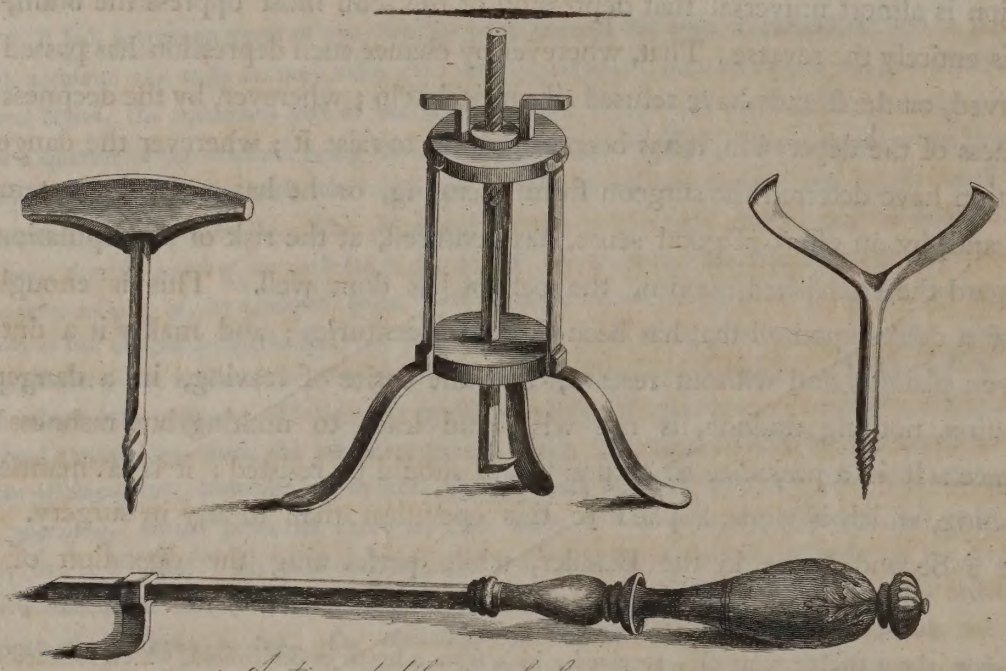
a slight convulsion, without being moved to do any thing rash or unbecoming *. While the tyro, just sent out from the schools, makes diligent inquisition into all the circumstances of a fracture, will allow not even a capillary fissure to escape his jealous search; and, where there is hardly any visible fissure, imagines such internal damages as may entitle him to "set to work with his instruments," and perform that great operation, which is to be the pride of his future years, "boasting of that which is his shame."

It is not honourable to our profession to have it thus proved, that while the opinion is almost universal that depression of the scull must oppress the brain, the fact is entirely the reverse: That, wherever by chance such depression has passed unobserved, or the friends have refused all surgical help; wherever, by the deepness and firmness of the depression, it has been impossible to raise it; wherever the danger of infection have deterred the surgeon from operating, or he has resisted the temptation, and, by an effort of good sense, has ventured, at the risk of his reputation, to disregard the established maxim, the patient has done well. This is enough to throw a doubt upon all that has been doing for centuries; and makes it a duty to tell you plainly, and without reserve, that the desire of leaving, in a dangerous operation, nothing undone, is not wise, and leads to nothing but rashness and violence: It is a prejudice so natural that it should be resisted; it is a manner of reasoning, which is worse applied to this operation than to any in surgery. To leave a Second Stone in the Bladder, while performing the operation of Li-

* A boy, about twelve years old, received a kick from a horse in Smithfield, which stunned him; and he was immediately brought to the hospital. The integuments of the forehead were divided by the injury, and the superciliary ridge of the frontal bone depressed *at least a quarter of an inch below its original level*; the depressed portion *measuring about an inch and a half in length.*

It is obvious that the bone could not be thus depressed, without a fracture of some part of the basis of the scull occurring at the same time, on which account the case might be considered as more dangerous. *In less than two hours he had recovered from the immediate effect of the blow, being at that time perfectly sensible.* Fourteen ounces of blood were taken from his arm; his bowels were emptied by a purge, and saline medicines, with antimonials, were directed to be given. He went on tolerably well for two days, at the end of which time, evident symptoms of considerable irritation of the brain took place. He now complained of pain in his head; slept little; and, when dozing, often started, or was convulsed in a slight degree. To remove these symptoms, he was bled twice, took opening medicines occasionally, was kept quiet, and without light, and was allowed only a spare diet. By continuing this plan for about three weeks, he perfectly recovered.

thotomy, is to do nothing: to leave diseased glands in the Axilla, when extirpating a cancerous breast, is to do worse than nothing: But to leave a *slight* Depression of the scull, even when the patient is stunned and sickened, or *any* depression where there are no bad symptoms, where the integuments are entire, when the patient is young, is to make a just and modest sacrifice of our wishes and prejudices to the safety of our patient.



Antiquated forms of Levators.

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EXCEPTIONS

To the General Rule of Leaving DEPRESSIONS *to* NATURE; *or* DEFINITIONS *of those* CASES *which actually require the use of the Trepan and Lever.*

I KNOW not whether I have persuaded you, but I have myself, to the most entire conviction, that of all the injuries of the scull that which is the most dreaded, viz. depression, is the least hurtful. I have seen such happy recoveries, where the depression was left undisturbed, such melancholy scenes when depression was raised at the expence of large perforations, and extensive openings of the scull,

that I confess myself very indifferent to this kind of danger, and very doubtful of the propriety of such operations: The practice which I think so very hurtful, it is my duty to oppose; and I shall now endeavour to keep my promise with you, of explaining, first, the general rule, so as to give you confidence, viz. "That you are not to trepan nor elevate every depression: and, next, "the exceptions, so fully as to prevent you, while you avoid the fault of hurry and impatience, running into any fatal error from neglect." You will find that I have considered these exceptions seriously, and that I retrace my opinions on this point to observation and experience.

First, The general principle which I have laid down is illustrated, and, I believe, proved, by this figure, (Fig. 1. sheet 1., where *a*) represents the point from which a fracture of the parietal bone is bent down; *b* the natural level of the scull; (*c*) the extent of the depression, deep and formidable when seen and touched outwardly; but the space betwixt (*b* & *c*) demonstrates how very little the depressed bone is off its level, how partial and trifling the pressure must be, how slight an intrusion this is upon the convexity of the scull; and the truth which this plan demonstrates as probable is proved beyond a doubt, since, under the most extensive depressions of the scull, the patient preserves his senses. Nothing is more essential than that you should have clear conceptions of the motives for applying the trepan: it is one great point gained, to say with confidence, that "this of depression is not among the number." I never saw depression occasion stupor, nor the elevation of it bring relief; but many times when the surgeons have been busy, in a mob, struggling and elevating depression, in a manner almost as rude as that of O'Haloran with his four levers, the boy or man have been struggling, remonstrating, and making every kind of resistance *: Nay, it is most singular,

* There are, in my recollection, no cases, and I find in my readings very few, in which the depression seems to have occasioned stupor, or the elevation of it given relief. The following observation from La Motte is perhaps worth your notice as much as any.

"A boy (says La Motte) was rode over by a young prancing horse, which pranced upon him. There was a great wound, and much bone naked; and besides there was a considerable depression, apparently made by the cauker or heel of the shoe. This boy I found lying upon his back, crying out continually that he was falling, that he was falling down! I trepanned, introduced the levator, and raised the depressed bone. This boy, while the bone continued depressed, had continually the feeling of a drunk person, of the room running round with him: But the moment the bone was raised, *and the extravasated blood evacuated*, he recovered his senses." P. 320.

and not to be found in any equal number of injuries of the head of any other complexion, that, in all the instances of deep and wide depression which I have just quoted, or have yet to quote, the patient was sensible.

Secondly, Though this general principle cannot but be acknowledged, it remains to be circumscribed by certain definite rules: As we should take different measures in a clean cut of the integuments, and a rude and mangled wound, where the parts were bruised, lacerated, and unfit for adhesion, we must take various measures in fracture of the scull, according to its peculiar circumstances; and as there are circumstances which are found to prevent the adhesion of wounded integuments or wounded scalp, there are many which will prevent the healing of a fractured scull, and cause it to inflame the bone, and affect the dura mater: These are the exceptions, and they must be defined, and it is for this purpose that I have sketched the plan, (Fig. 2. sheet 1.) representing that kind of depression which I judge to be safe. It is not by present pressure that fracture is dangerous; therefore, when it runs in a right line, when there is a general depression, but no particular point forced in upon the brain; where the declination of the depressed from the sound part of the scull is gradual and uniform; when the whole line (*a b*) is generally depressed, and the central point (*c*) sinks deeper; though you can feel the hollow with your finger, and can see it (not without apprehension) when the coagulated blood is discharged; yet as the center (*c*) does not intrude upon the brain, as this point does not dip so as to present points or spiculae to the dura mater; as there is no rough edge presented on the inward surface, nor any rude shock, like that of a ball, to deprive the bone of life and prevent its healing; as it is broken by such a force as fractures other bones, and is surrounded (as marked at *d*, fig 1.) with a mass of cellular substance, thickened by inflammation, and by the injection of blood into it, such as reunites other fractures; the scull, pericranium, and dura mater, all mutually adhere, and the effects of such depression are never felt.

Upon every principle, and every precedent, we are bound to commit such a case to nature: it daily happens that boys have the forehead thus flattened by the kick of a horse; sometimes dangerous spiculae, as where the caulkers of the shoe have pierced the bone, are cut away, and very properly, with the trepan: sometimes, too, the bone is elevated; but very often it is left untouched, the wound lightly stitched, and dressed dry, and the parts re-unite and heal as in any other wound, a visible, but harmless, depression remaining. While the integuments are

Plans and Drawings of Fractures and Depressions of the Skull.

Sheet 1st

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Fig.1.

Fig.2.

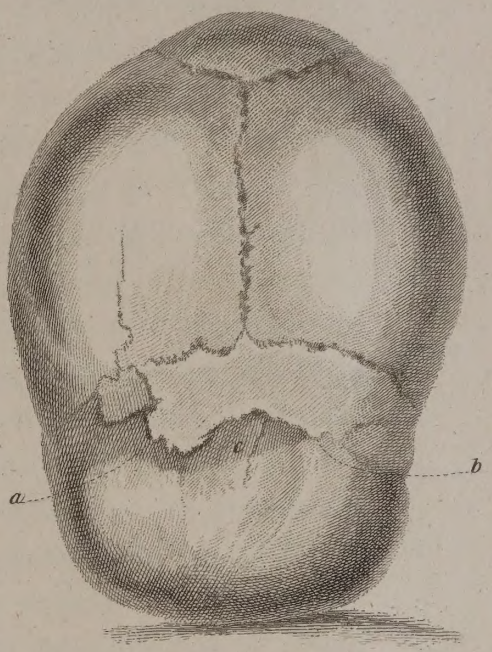


Fig.3.

Publish'd April 21st 1806, by Longman, Hurst, Rees & Orme, Paternoster Row, & Cadell & Davies Strand.

Engrav'd by E. Mitchell Edin.r

Drawn by I. Bell

entire, the inducement to leave them so is particularly strong; when left entire, the consolidation of the parts, and the absorption of the blood, is certain, or almost so: to open it, is to convert a simple into a compound fracture, with every danger of its not healing favourably. I remember to have put in my finger, through a wound in the scalp, and felt, in a very old woman, near 70 years of age, a depression of the parietal bone of two inches of extent, the fracture wide, the edges rough, and the depressed bone apparently driven far below the unhurt part of the scull; and the only notes I have taken of the case are, that she never passed one sleepless night, nor had one hour of sickness; her appetite never declined; that she sat up to be dressed, and kept her bed a few days only, through precaution rather than for want of spirits or strength, and recovered as from the most ordinary wound. In those less advanced in life there is less danger; and we have the best authority (the authority of those whose general practice is to use the trepan) for affirming, that in such cases, not only the present depression does no harm, but the fracture unites, and the wound closes; the patient may even be seized with shiverings, and the part with suppuration, (strong reason for suspecting a carious bone), yet such abscess, being punctured, will discharge "a considerable quantity of matter," and the patient be in no danger *: Nay, we are assured, on the same

* "Mrs Grogan fell from a window into the street, and received a violent contusion on the front of the coronal bone. I saw her the next morning, and found a considerable tumour, which to the touch seemed to contain some fluid; but as I had seen many similar ones subside in four or five days, by the use of compresses wet in spirits, I treated this in the same manner. The swelling, however, remained, and in five days I proposed opening it, which she would not permit. The sixth day she again sent for me; the tumour was still the same, but the fluctuation not so sensible. I laid open the part, and a good deal of coagulated blood was discharged. She complained all that and the next day of pain, and a thin bloody sanies came from the wound. *I found not only the bone bare, but a considerable fracture, with some depression.* I pressed with my finger the sides of the bone, but it remained firm to the touch, and she felt no uneasiness from it. I kept the wound open for some days, and finding no alarming symptoms, suffered it to heal, which it did by the end of the month. I recommended her to keep the part covered for some time, on account of the thinness of the cicatrix. This she neglected. In some days after, leaning over a garden wall, with a smart wind in her face, she was seized with a violent pain, and imagined the wind was piercing into her head. She slept little, and was the whole night in a fever. Next morning, I found *the forehead greatly swelled, and let out a considerable quantity of matter.* In some time it got well; she had it covered with adhesive plaster, and never after complained."

impartial testimony, that a bone loose and somewhat depressed will fix again*. But in boys especially, where depressed bone has in general no sharp edges; where the scull rather bends than breaks; where the bone is vascular and growing, and the circulation in it and in the integuments sound and vigorous, the chance of fracture healing is so great, that I would not presume to touch it, unless in most peculiar circumstances; especially as in boys the dura mater is too tender to serve as a second scull to sustain the pressure of the circulation within the brain: wherever it is necessary to make large openings in the cranium of boys, protrusion of the brain and death ensue.

It is not then the present but the remote consequences of depression we have to dread: a depressed is more apt to become CARIOUS than a direct or linear fracture; and it is as a fractured Rib or Sternum inflames the Pleura or Pericardium, that depressed fracture of the scull by becoming carious inflames the brain. This is an *accident* which may happen in any form of fracture, where the bone is but laid bare, or scratched, or punctured, as well as where it is depressed; it is one for which the surgeon, who has endeavoured to reunite the fracture, can be no more blamed than he could be blamed for an extensive suppuration of the scalp, where having stitched the lips of the wound lightly and nicely together, and taken every pains to prevent suppuration, it had yet suppurated; but it is an *accident* so frequent, and indeed so much depending on peculiar forms of fracture, as to occasion a variety of exceptions to the general rule.

Thirdly. The first exception which I would explain to you, is not of this nature, but depends on other concomitant circumstances. A fracture, with or without depression, may be of such extent as to indicate great violence, the concomitant symptoms announcing extravasation: The fracture traversing the channel wherein the great branches of the arteries of the dura mater are lodged, they are often lacerated, and pour out much blood, which may be actually seen oozing through the chinks of the fracture, and in such circumstances it is our duty to operate: but then our sole motive for operating is to relieve the brain from

* « Samuel Haste received a wound on the upper part of the right parietal bone, of two inches long, *with a loose bone and fracture.* Though the fracture could not admit of a doubt, yet there seemed to be but little depression, and the sides of it were firm to the touch. I saw no reason for the operation at present, but carefully attended to the symptoms. In the space of four weeks the bone became covered, the wound healed, and he has since enjoyed perfectly good health."—*O'Haloran.*

the blood which oppresses it, not on account of the fracture, which only marks the place of the chief violence. Figure 3. may represent such a fracture; where (*a*) marks a wide fracture (through which the black blood is seen) running down into the orbit, perhaps into the basis of the scull; (*b*) two other limbs of this wide and gaping fracture, running down along the temple, and backwards through the parietal bone; (*c*) represents a large corner of bone depressed, apparently loose, and so surrounded and insulated by the various chinks of the fissure, that you would believe, first, that it would be easily removed if that were reckoned prudent; secondly, that it must be perfectly easy to elevate the slight depression of a bone so insulated; thirdly, you would be naturally inclined to fear that such a bone could not have sufficient circulation to live: but all this is deception, a very common deception; for such a bone is steady, immoveable, cannot by any force of the levator be elevated, and lives, and granulates: (*d*) marks the trepan circle which should be made in these circumstances, and the piece of bone being sawed through and picked away, the half-coagulated blood rolls out as black as pitch, and the patient is relieved and finally saved.

This represents in truth the head of a very stout sailor lad, who, in going out upon the main-yard, to get in the studding-sail boom, fell clear from the height of the main-yard: no stay nor tackle broke his fall; he had not a wrist nor any part pained or bruised; he lighted full on his forehead, which bore the whole force of the fall, and, by hitting a cat-head, (a solid projecting clump of timber, round which the tackles are secured) his scull was fractured with deep and wide rents, running downwards towards the basis, in every direction. This happened on Sunday evening; he was immediately carried down to the cabin, and lay long insensible, and when he revived, found himself cold, giddy, sick, and powerless, and continued to vomit for some hours.

On Monday, when I saw him, there was no delirium nor confusion of intellect, night nor day; no faultering of the tongue; no dilatation of the pupil; no sign nor degree of palsy in the left side, and the vomiting had ceased: He complained of nothing but of indescribable suffering in his head, and a sort of oppression and misery during the night; yet his condition was very decidedly marked by a sign, which I have seldom found deceive me, a slowness and marked intermission of the pulse, which, throbbing slowly and heavily, pauses at every fifth or sixth beat. The wound in his forehead was right-lined, of small extent, about an inch and a half; not mangled nor lacerated; the lips not puffed up by extravasation, but sim-

ple, as it had been made with the blow of a pocker; and through this wound the probe, passing obliquely, discovered a slight depression, a rough edge of bone, and wide fractures, through which the buttoned point of the probe might have passed. His condition was singular: He was a big and fleshy lad; and, from the steadiness of his posture, the sluggishness of his motions, the manner in which his limbs were folded, and the slow and oppressed way in which he spoke, from the slowness of his breathing, together with various indescribable circumstances, one felt, while standing over him and rousing him to answer questions, as if conscious that he lay heavy on his bed *. His answers, even to the most curious questions, were circumstantial and correct; but they were extorted by urging him to reply: his answers to each question were delivered slowly, after drawing a long breath, and with an oppressed sigh. He seemed to feel great oppression at the scrobiculis cordis: his head always dropped upon his breast; and his hands, when you raised them, dropped heavily by his side. You were conscious of the pain it gave him to renew a conversation, by the slowness and sighing with which he began his replies: he lay still, oppressed, breathing slowly, with deep inspirations, and he had a corresponding pulse, for it throbbed slow and heavy, beat just 50 in the minute, and at every fifth or sixth throb, it paused distinctly the space of one slow pulsation.

His suffering during the night, he said, was inexpressibly great, but it was such as he could in no shape describe. He was told how doubtful his condition was, and how likely that we should advise him to submit to an operation: After passing one night more in this oppressed condition, he allowed us to elongate the incision, making at the same time a crucial one, by which these terrible fractures (fig. 3.) were displayed; but the inner surface of the flaps of skin was so exquisitely sensible †, and he was so far from feeling all his misery, that he insisted upon being carried to bed.

* I do not scruple to copy expressions of this inaccurate kind from my Case-book, when I find them, however incorrect, to be suited to convey those lively impressions which one has only in the moment of looking upon a patient.

† I cannot but mention here with approbation, the thin plates of iron used by Mr Croker King, as Defenders. I have often seen much crying and struggling, severe and indecent violences used, the operation much protracted, and conducted altogether in a manner which must have shocked every spectator, from the want of them. Something of this kind should be in every trepan case; this mea-

But, two nights more of that indescribable suffering, which he had tried to express to us, quite subdued him: He said, "Whatever we pleased to do with him, was now welcome." The flaps of scalp were now, on Thursday, in a state of suppuration; the black blood was, at the time of incision, distinguished through the fissures; and upon the circular piece of bone (*d*) being cut with the trepan, rolled out in large clots. I could feel a great hollow betwixt the scull and dura mater, which was depressed by the extravasated blood, and the probe pressed along unobstructed for several inches, in every direction, from the trepan hole. To talk of repeating the perforations till an extravasation of this extent were uncovered, would be to think like a school-boy: the process was in this case simple and uninterrupted. The patient's anxieties and oppression were gradually relieved. He was trepanned on Thursday; on Friday he felt quite relieved; on Saturday, his slow, throbbing, and intermitting pulse, had risen from fifty to eighty in the minute; and at each dressing the blood diluted with a sort of serous exudation from the surfaces melted and flowed out. At the first dressings, I made way for its flowing out more freely, by introducing the probe, wrapped in oiled lint, and moving it gently round betwixt the scull and dura mater; and as the dura mater rose, which it did visibly from day to day, it assumed a vermeile colour: the scalp, bone, and dura mater were, in course of a fortnight, one undistinguished mass of red granulations; the process of healing was rapid and uninterrupted, not even interrupted by the loosening of a small piece of bone, which was partly cut by the trepan and partly insulated by the fracture, and which I picked away, without the help of forceps, with the probe. I find that, on the Sunday following, I had been obliged to turn out large clots of blood with the probe, which presented at the trepan hole, and extended far under the scull; and that, on the following days, I was occasionally obliged to use the syringe, with tepid milk, to wash out clots.

Fourthly. Yet you must perceive, that it is not in such cases, that the gaping fracture, or even the excessive depression, that is an object of concern, but that the extravasated blood is at once the cause of the danger and of those signs which denote its existence; and those signs of extravasation may be so decisive, especially when conjoined with fracture and depression, as to induce you to cut open the integuments and perforate the scull, as in figure 4. This sketch, figure 4. represents the

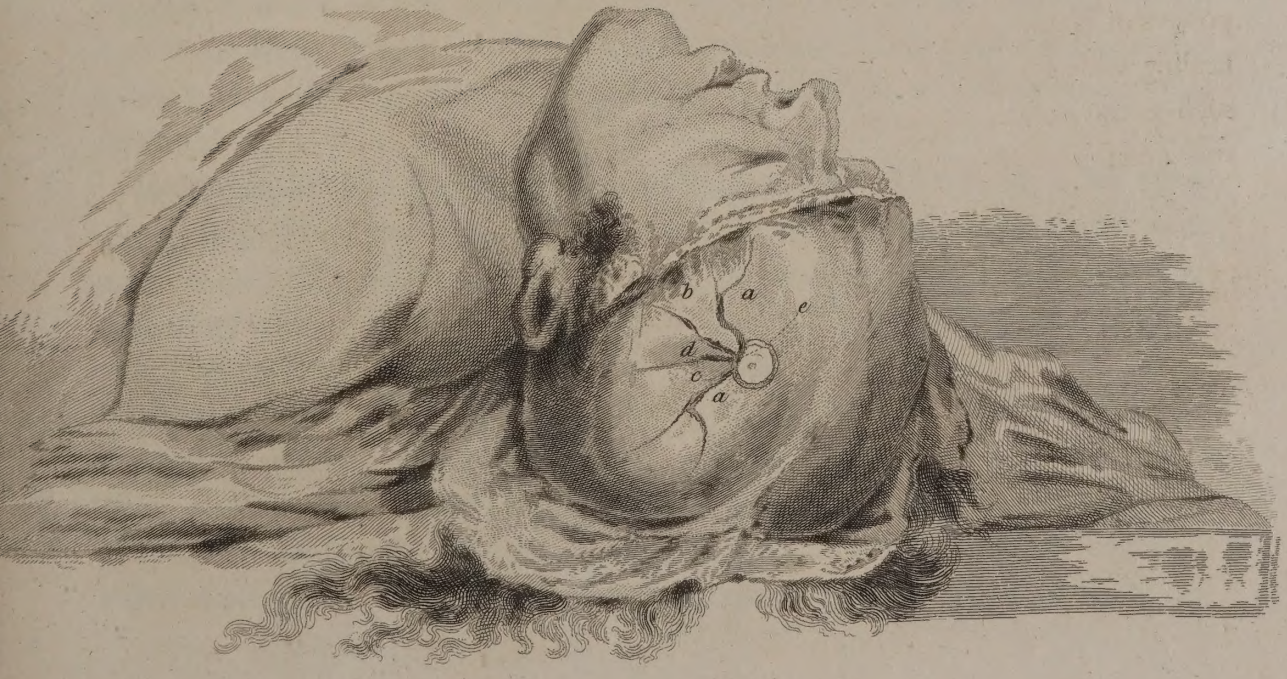
sure of precaution prevents one of the most meritorious and necessary acts of professional cruelty from both appearing more barbarous, and being actually more painful, and less easily accomplished.

head of a fine sailor boy, of about fourteen years of age, spirited, active, and very thoughtless. While the vessel was unloading, he tripped in skipping about the deck, pitched headlong into the hold among casks, and was carried up into the air in a state of stupor, bleeding from the nostrils and vomiting. There was no external wound, but a universal extravasation of blood into the cellular snbstance of the scalp, especially over the right eye-brow, by which the eye was almost closed. It was some time before he was removed from the ship in the roads; and when I first saw him, it was easy, through the integuments, swelled as they were, to distinguish fractured edges, and a depressed bone; but the extent or form of these could not be ascertained, and indeed they never should have been with me a motive for making incision into the swelled scalp, but that he lay still in a state of stupor, vomiting, and bleeding from the nostrils: his stupor was not the deadly snoring of the apoplectic state; it had the peculiar character which I have just attempted to delineate: He could be roused, was sensible and rational when excited, but still he was in a state of stupor, into which he instantly relapsed. Generally the removing the patient to an operation-table, and almost always the first incisions, excite the patient, though delirious, he becomes rational, though torpid, he is roused; yet still, even when thus roused, his actions bear the character of stupor or delirium. This boy, when carried to the operation-table, was roused to a perfect consciousness of every thing around him; and, when the operation was done, said, "I think I have borne it with spirit."

This boy then was perhaps a fit subject for the experiment of trying, how far the powers of Nature might prevail, in at once supporting the system under oppression, healing wide fractures, and absorbing much extravasated blood; for while there was such extravasation outwardly, along with conspicuous fracture of the scull, there was great probability, almost a certainty, of extravasation within. It was an experiment I did by no means feel myself intitled to make; because, the stupor, the vomiting, the haemorrhagy from the nostrils continued: I therefore made an incision into the tumor, a long incision, which, directed by what I felt without, uncovered a long fracture, the circumstances of which are represented in this sketch. The lower part of the forehead was more swelled with saggilation; the eye was more closed; the edges of the incision, when laid aside as here represented, were more choaked with coagulated blood than can be well represented in a drawing: the coagulated blood was also injected so into the cellular substance of the pericranium, that the fractures could be better felt than seen: but, one great fracture (*a*) running down the forehead, passed into the orbit, and was so very wide that it

Fig. 4.

Fig. 5.



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easily admitted the handle of my scalpel: the other limb of the fracture (*b*) run round in the direction of the coronal suture; the whole piece and corner marked (*c*) was deeply depressed, and so far locked under the edge (*d*) that it was necessary to make those two perforations, and to cut off a small projecting corner with the finger-saw, before we could think of using the lever. The blood rolled out through the first perforation. The depression of the dura mater by the blood was as great as in the former case; the circle in which, I could with the probe feel it detached, was as wide: The rising of the pulse, which had been oppressed; the recovery from the stupor; the granulation of the dura mater, and the closing of the wound; and the daily issue of clotted blood, make this, in all respects, a just parallel with the case I have just related. The extent of the wound was such, that the boy was not dismissed till the 9th of January, the 7th of September being the day of his fall: But what surprised and gratified me was this,—The piece of bone marked (*c*), which had been depressed and elevated, actually moved with each pulse of the brain, so loose did it lie upon the dura mater. I feared, when I saw the dura mater through the trepan holes, red and granulating; when, on the 20th day from that of the operation, I found also all the exposed part of the scull covered with a fine and florid pile of granulations, this triangular piece of bone excepted, (which continued yellow, quite bare, and still moveable), that it must become entirely carious, and exfoliate; and that this, by protracting the cure, or, by its exposing the brain, might bring the boy into new danger: I had this impression on the 30th of November, and marked it in my daily report; but by the 6th of December, the same pile of florid granulations had crept along over the whole surface of this portion of the scull, and by the 14th the whole wound was cicatrized.

Such wide and gaping fractures, then, imply a very heavy blow, or a fall from a great heighth: I find them often accompanied with deep apoplectic stupor, with palsy of one side, dilated pupils, and involuntary stools; with groaning and sighing, an uneasy tossing from side to side in bed, as if from oppression, and a frequent raising of the hand to the affected side of the head.

Fifthly. There is a kind of danger inseparable from certain forms of depressed fracture, which no experienced surgeon will despise. The fracture, No. 2. sheet 1. flat and even, having no particular point depressed, causing no stupor, and attended with no ill signs, is by no means a fit subject for operation: but, where (as in sheet 2. fig. 2.) the fracture is radiated and pointed, where the bones

do not "lie pashed or loose upon the dura mater," and yet are much shivered; where not a long flat edge is driven under the sound bone, but particular points are depressed, presenting probably on their inner surface spiculae and irregular and jagged edges, there is imminent danger, not from the depressed bone lying heavy upon the brain, but from its points pricking the dura mater, whence, on the eighth or tenth day, inflammation extends from the membrane to the brain, shiverings and tremors come on, and the patient dies: Not the long and wide fracture (*a a*, fig. 2.) nor the general depression produced by the yielding of the three triangular portions (*b*, *c*, *d*.) are the cause of danger, but the dipping in a more perpendicular direction of the point (*d*), which, being central, has received a great proportion of the force, and which, by being driven deeper than the lateral parts (*b* and *c*), is likely to carry down splinters from the inner table of one or both these portions: It is because the scull consists of two tables, and not by the peculiar fragility (though it is more fragile) of the inner table, that points and spiculae of it are so apt to be driven into the brain: when the pointed portion (*d*) is driven below the level of the contiguous parts (*b* and *c*), it leaves behind it the outer table of each of these portions, but it passes the inner table, and, as it is driven inwards, every inequality, or angle of the fracture, makes a resistance by which splinters are not only carried before the point (*d*), but driven vertically, like pins or sharp wedges, through the dura mater. The experienced surgeon distinguishes at a glance the forms of fracture in which there is danger of this kind: and, in a fracture of the form here described, *radiated*, *pointed*, *and depressed*, as there is no room betwixt fragments lapped over other, like fingers when plaited and squeezed together, to admit a lever, I think it right to apply the trepan at the angle (*e*), (as usually there is such an angle in every fracture of this species), through which the lever, being introduced under the depressed points, raises them, and the probe, being turned round within the scull, will ascertain whether any rough edges still present, or whether any spiculae or dangerous points stick in the membrane.

Fifthly. Fractures of this form may prove dangerous, but depressions of the kind which I am next to describe must be so. The form of depression represented in sheet 3. fig. 6. is such as happens when a man is thrown from a stumbling horse, and pitches with his head directly against a stone; or when he falls from a yard-arm, for example, and pitches upon the deck; or when a block and tackle, or a corner-stone from a building, falls directly upon his head. This fracture is described by

Fig. 7.

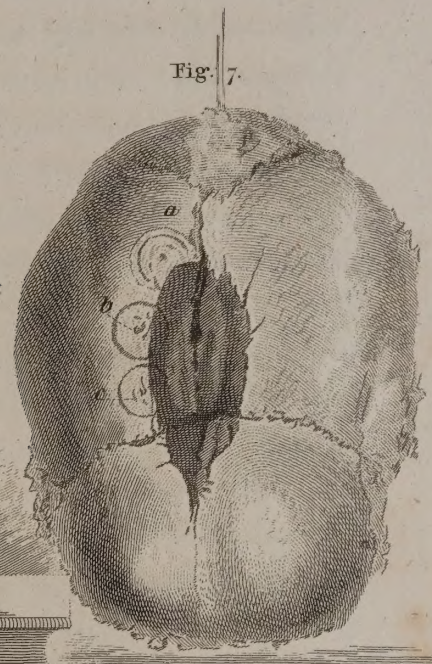

Fig. 14.

Fig. 6.

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Engrd by F. Bell & Son

Drawn by J. Bell

the ancients under the title of *Cameratio*, the camerated fracture, as resembling the inverted tiles of a house; the center is depressed in a direct line, the sides decline towards that center, like the form which the two hands make when laid together edgeways. The form of this peculiar fracture has been but too minutely described; while its character has been less an object of attention, though, from its very form, these inferences are plain: First, That in consequence of its great extent, both lengthways and from side to side, the oppression of the brain, if such an effect could be produced by depression of the scull, should be most manifest; yet I affirm, from experience, that such effect is rarely felt, and shall prove, at the least, that oppression of the brain is not inseparable from this kind of depression: Secondly, I shall prove, That from the depth to which the central line, or direct fracture, is depressed, there must invariably be presented two rough and very dangerous edges, which, by irritating the dura mater, will cause suppuration: Thirdly, That though the patient should escape this danger, the circular fracture or crack which surrounds the whole, and which must invariably accompany depression of this form, (without which indeed the bone, in an adult at least, could not yield), must almost always insulate the depressed pieces, they must in nine of ten cases become carious, and to prevent these manifest dangers, I imagine it to be clearly the duty of the surgeon to elevate and pick them away, by pressing in his lever betwixt the edges of fissures usually very wide; or, this being either impracticable, on account of the wedge-like impaction of the depressed portions, or dangerous from the dipping of one end of so long and broad a fracture, while the other is rising, he should apply the trepan in the manner represented in figure 7. applying successively the crowns of the trepan (*a*, *b*, and *c*.) till the bone can be raised without being turned in upon the brain.

The case, which I have selected for illustrating this principle, is that of an old man, of the name of Thompson, who might have been saved by a timely operation, but who was lost by delay. He had fallen headlong down a precipice, (the Calton), fractured his scull, had a depression of the depth and extent you see marked in this slight sketch, (sheet 3. fig. 6. and 7.) a double depression in the very course of the great longitudinal sinus and of the falx, which, if any thing could oppress the brain and disorder its circulation, should have produced that effect: but so slightly was he affected, that nineteen days elapsed without himself feeling, or his friends suggesting, the propriety of procuring assistance. At the end of twenty days, this was his condition:

The depression was manifest to the touch and to the eye; the whole extent of the bone was black and bare, and a pale granulated fungus surrounded it: he had never, from the moment of the accident, had one hour of sickness, or vertigo, or any considerable pain, but, on the twentieth, began to lose his appetite, became drowsy when undisturbed, and languid when forced to speak or move; his pulse was rapid and small, his nights were passed in confusion.—On the twenty-second day, he complained of more than usual pain, of slight vertigo, and of nausea; and these symptoms succeeding a night of confusion and delirium, in which he struggled often to get out of bed, made it necessary to perform straightway an operation so obviously necessary, which had indeed been resolved on, and delayed only by necessary arrangements. The crown of the trepan was applied twice, and through each perforation the lever was introduced, and the bone poised up, but could not be safely moved till the third perforation set it quite free, when all the blackened bone was taken away.

But long before the operation was performed, the fatal inflammation had begun; so it appeared from the depth and extent of the fatal abscess, which had indeed destroyed one entire hemisphere of the brain. Hitherto his state might rather be described by the term drowsiness than stupor: but the delirium of the night preceding the operation was a decisive and fatal sign. This delirium never ceased: in the present, as in all cases that I have watched, the symptoms were aggravated during the night: In suppuration of the brain, every long slumber is followed by a degree of delirium, and the fate of a patient, whose condition cannot be suspected from any symptoms occurring during the day, may be prognosticated from the confusion in which he passes the night. Through the night following the operation, our patient started up frequently, struggled to get out of bed, talked incoherently, but the return of light restored his senses, and during the day he was rational and composed, but still he slumbered. This was his condition during the nine days that he survived the operation: His pulse was a hundred and twelve, weak and variable; he was restless and confused during the day, especially after slumbering, and was delirious during the night: from the opening in the scull, there was a considerable oozing of blood and of bloody serum. The third and fourth nights after the operation were less perturbed: during the fifth and sixth, he was extremely restless and agitated, speaking much, and struggling to get out of bed: the dura mater appeared now black and sloughing, with a foetid, thin, and blood discharge. On the seventh, he became comatose; his cheek had a circumscribed and hectic flush; his pulse beat 120; there

Fig.8.

Fig.9.

Drawn by J.Bell.

Engraved by E.Mitchell Edin.r

Drawing of the dissected Cranium of Thompson, whose Scull was Trepanned too late to save him: representing, first, The external Surface Fig.8. having the Trepan Holes & a great opening made by the elevating the Carious Bone: & second, the internal surface Fig.9. having part of the Ulcerated Brain still adhering.

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was no more delirium, he lay insensible, and passed his urine and faeces inconsciously: On the sixth, seventh, and eighth days, the coma became deeper; he lay still, and muttering; and, after slight convulsive rigors, expired, on the ninth day after the operation, the twenty-eighth from the time of his fall. In describing deep suppuration of the brain, to speak of the laxatives and draughts that are administered, or of their effects, were a very trivial detail.

The dissection of the scull and brain are represented in the Plate facing this page, where (fig. 8.) shows the external surface of the scull, the whole extent of the fracture and of the denuded dura mater being seen; where (*a*, *b*, and *c*.) denote the three circular incisions made with the crown of the trepan; (*d* and *e*,) the parts of the scull which had scaled off, rather by ulceration and caries than by the force of the blow; from (*f* to *g*) marks the extent of the naked dura mater, while (*h*) marks a large slit-like opening, an inch or more in length, caused by sloughing and bursting of the dura mater in the latter days of his existence, and through which the matter from the abscess of the brain flowed copiously. The whole of the right hemisphere of the brain was in a state of suppuration; the basis of the abscess was very large; the opening through the dura mater, as represented at (*i*) in figure 9. was like that made by a large abscess lancet, into the sac of any great tumour: the medullary substance of the brain was soft and gelatinous; the part immediately surrounding the abscess was gangrenous, marked by a black or leaden colour, extending an inch or more round every part of the abscess, and terminating in a disk or halos of a deep green colour: The left hemisphere was also, in a degree, tainted with the same colours and slightly ulcerated on its surfaces.

Seventhly. Punctured Fracture is that form of wound in the bone which has the same relation to these wide fractures and broad depressions, that the stab of a bayonet has to the cut of a sabre: plainly and indisputably requires the trepan, for in no case can we divine how deep the point may have gone; how far the ball, weapon, or point, may have sunk into the brain; in what degree or form the bone, especially its inner table, may be fractured: blood is often extravasated, and often spiculae stick in the dura mater, or in the sinuses: The present injuries are sufficient motives for applying the trepan, and caries is in this form of fracture almost inevitable. I hold it to be the duty of the surgeon in all such fractures to use the trepan; to place the center-pin of his instrument as close by the center of the fracture as its irregularities will allow; and to operate with a crown so large as to cover all the fracture, and cut it out at once. The sketches, (sheet 4. fig. 10. and 11.)

represent punctured fractures. Figure 10. represents that of a man who having, in a low tippling cellar, got into a drunken brawl, one Sunday night, was, by the man who kept the cellar, pushed backwards, (but without a blow and without malice), and his heel encountering a stool, he fell directly backwards, so as to hit the ear of a carron pot, and the point of it, entering deeply into the occiput, made a punctured wound, which you perceive might have been entirely covered and fairly sawed out by one large crown of the trepan; but the brain was so inundated with blood, from the splinters of bone transfixing the sinus, that he died, I may say upon the spot, in convulsions: he died betwixt night and morning, and before we could have matters arranged for applying the trepan: the immediate and first inquiry proved so manifestly that there was no malice, that no prosecution ensued. Figure 11. shows the star-like fracture produced by the ball, in the French Captain, whose case is narrated in an early part of the volume, whose life was in danger from that caries which must have come in process of time, who was saved by cutting out at once the shattered bone and flattened ball.

Such cases remind me of the necessity of establishing this as a rule, "That all punctured fractures should be trepanned," and of enumerating the general accidents by which they are produced *. When a man falls backwards against the sharp cor-

* The melancholy consequences are admirably depicted in the following singular cases, where the fracture was so minute that, had the integuments been fully opened, it might have escaped investigation; and yet the cutting out of such punctured piece of bone early could alone have saved the boy's life.

—— Brand, aged about 14, was struck on the temple by a pair of scissars flung at him, the point of which stuck a little above the external canthus of his eye, till it was pulled out. A bit of sugar tied on the wound by his mother stopped the blood. He complained little for two or three days; but the pain gradually increased every day after. However, he went about till the eighth day, when he fell into convulsions, and I was sent for.—There was a hard tumor under the pericranium and crotaphite muscle, so tense that a fluctuation in it could with difficulty be perceived. The tumor lay so exactly under the artery, that it could not be laid fully open without wounding the artery. To prevent an haemorrhage, therefore, I cut the artery and all through to the bone with a bistoury. About half an ounce of well-conditioned pus rushed out, by which he was greatly relieved.—When I thought enough of blood had been discharged, it was easily stopped by a dry dossil and a halfpenny in the compress.—Next day he was brought to town; and Dr Gilchrist ordered such internal medicines as were judged proper for him, and he continued easier for two or three days. After which the violent headache and vomiting returned and lasted two or three days more, when a large quantity of matter burst out from within the scull, which again gave some ease.—But, though the orifice in the integuments was enlarged, no further discharge could be procured. He died in a day or two

ner of a stove or grate; when, by the bursting of a fowling-piece, either the fragments of the gun-barrel, or the breech-pin enter into the forehead; when, by a blow from a hammer, from the keys of a crane swinging and hitting the head; when, by the blow of a sharp pointed stone, making a radiated wound of the scull, depressed in the center; when a splinter from a carronade, or bolts, nails, or other fragments of iron have, in a sea engagement, penetrated the scull; when a musket-ball, a dagger's point *, or the point of a pike or bayonet, stick in it—the fractured

after, being the sixteenth day after the accident.—On opening his head, half a pound of pus was found in the brain, and the hole in the scull made by the scissars would not admit the point of a pin.—His friends absolutely refused the trepan, by which he probably might have been saved His death, however, was of use to others, who more readily submitted to the operation, upon seeing the fatal consequences of neglecting it in his case.

* In page 16 of Marchetti, there is an interesting case of a man who had been wounded with a dagger. "He was apparently cured, a sort of cicatrix was formed; but all was not sound below; for in about three months after, he began to have epileptic fits; and he had his fits about two or three times every month. Sala, who was in the consultation with Marchetti, asked him, whether he had ever had a blow on the head? He told the story Then, a probe being introduced under a sort of scab, which was in place of a proper cicatrix, they found a fistula, leading to the bone. The opening was dilated with the knife. Next day the trepan was applied: a yellow ichor flowed out from the dura mater; it was filled up with florid granulations. In thirty days he was cured, and the epilepsy never returned."

"A few days before the battle at Worcester, while we were dressing the wounded soldiers, one was brought to us shot with a musket-bullet on the right side of his head. My servant Will. Clarke, now dwelling at Bridgenorth, in dressing his wound, felt the shot sticking deep in the scull. I hastened to him, and saw the man speechless. We laid the cranium bare by a circular incision, and permitted it to bleed: then passing in a levator, we raised up the bullet, and pulled out the depressed bones, with which there came away some blood, and a little of the brain. This being wiped away, there appeared a large wound in the dura mater. We dressed it with a sindon dipt in *ol. ros.* and *resina*, and filled up the cavity wish dossils of lint. Having so likewise dressed up the trepanned bone, we applied our digestives to the lips of the wound, with *emp. è bolo*, and bandage over all. Before we had dressed him up, he lifted up his eyes, and asked how he came amongst us. Several other things he demanded of us. We caused him afterwards to be removed, and continued our care of him. The wound did digest, and somewhat of the brain came away each day; yet his speech continued: But what became of him after our defeat, I do not know.—*Wiseman, p.* 148.

Bartholine tells us of a man in Pavia, who being wounded behind the ear with a sword, the point stuck in the bone. He remained at Pavia some months. It would appear that the surgeons had made many attempts, but surely they must have been irresolute ones, to take it out. He left Pavia: He died of it. But how long he lived with the point of the sword sticking in his scull, Bartholine did not know.

bone, and the fragment of the weapon or the ball, must be cut out with the trepan, else, slightly as the patient feels the wound, he will, by the inflaming of the bone and the suppuration of the dura mater, be irrecoverably lost, before the symptoms indicate danger. These are almost the only fractures in which I think the largest sized trepan should be used.

Shocking as the accident was, which I am now going to relate, I hardly ever saw a punctured fracture that I would so willingly have left to nature as that represented in the drawing, No. 12. which represents the scull of Billy Cameron, a boy of about twelve years of age. He was occupied a whole morning, with his little playfellows, in swinging upon an area door: The staple was loose; the insecurity of the door made a part of the pleasure they had in swinging upon it. When it came round to this little boy's turn, the stone in which the staple was socketed gave way; the gate of cast iron, the corner-stone, and the boy, tumbled all at once into the area: A good woman ran out instantly to lift the boy, and found him lying with his head pinned to the ground, betwixt two of the iron pikes, one of which had grazed and wounded the left side of the head, while another had pierced the scull, and was sticking in the parietal bone, the weight of the gate and the stone lying above him. She carried him in her arms into her house, where he lay without a sigh or a struggle, cold, pale, and death-like, for ten minutes: he then began to draw long breathes, to groan, and to open his eyes; when his elder brother passing, and hearing of the nature of the accident, went into the house from a common impulse of humanity, and found his little brother in this mangled condition. He called a sedan chair, and placing him on his knee on pillows, brought him to the Infirmary.

Vestingius told Bartholine another singular instance, somewhat of the same kind, of a woman who was wounded by her lover (out of jealousy upon the entering of a rival into the chamber) with a dagger, the point of which stuck in the scull: but this woman recovered; for though they could not at first extract the point of the weapon, yet, after some time, the wounded part of the cranium gave way of its own accord (probably by suppuration and caries); the point of the dagger loosened, and they got it drawn out with forceps. And J. Dom. Sala told Bartholine, That he had even seen a person live, with the point of a sword sticking not only in the bone, but in the substance of the brain itself, who enjoyed tolerable health, except that he had frequent epileptic fits. But how they could allow a man to continue in such a dangerous situation, with the point of a weapon plainly sticking in the brain, with epileptic fits, and exposed of course, upon the slightest irregularity, to be seized with paralysis and convulsion, and so to die, amazes me. Why, if it had been a thorn sticking under the nail of the great toe, they should have cut it out.

Sheet 4th
Page 800.

Fig. 12.

Fig. 11.

Fig. 10.

Fig. 13.

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By the time his father and mother had arrived, he was quite collected, and in his senses, he was sitting up, while his head was shaved, his mother took him upon her knee, and soothed him; he laid down his head upon her bosom, and cried; but he wiped away the blood carefully and nicely with his handkerchief; was perfectly collected and obedient, and neither cried nor struggled. The wounds were, one upon the left side, slight and superficial, from the grazing of one of the pikes; another in the right temple, or rather about the center of the parietal bone, very deep. The punctured wound of the integuments admitted a probe, which, passing obliquely backwards, encountered the edge of a deep depressed fracture: The iron point had not directly pierced the scull, but crushed and burst through the bone obliquely, and, by a lateral pressure, it had so bent down a piece of the scull, that the fracture was long and the depression broad; but the integuments were only slightly wounded, they were punctured, and not torn. The boy was in his perfect senses, without even that tremor or agitation which such an accident might occasion; no weakness of one side; no stupor; no vomiting; no dilatation of the pupil; no slowness nor pausing of the pulse, such as usually accompanies effusion of blood. I was averse from the proposal of opening the integuments, and ventured to prognosticate the worst consequences if a fracture, already so extensive, was trepanned, and the bones torn away: But the boy, though there was not the shadow of an ill symptom, was trepanned; a long incision was made: the crown of the trepan was applied where the circle is traced in this plan at (*a*) No. 12.: the two pieces of bone, (*b* and *c*), each half an inch broad and an inch long, were twisted and pulled away; two smaller fragments were loosened and pulled away by the help of the levator and forceps: all in short that was depressed was disengaged and separated; and the boy, whose condition was after the accident doubtful, lay now in a most perilous state: the integuments cut up to the extent of three inches; the scull opened to the same extent; the dura mater left to sustain alone the force of the arterial pulsations, the brain already protruding, even while the dura mater was still entire. I never, in boys, find the dura mater capable of supporting itself; wherever the openings are thus wide, it inflames, sloughs, gives way at one or more points, and the PROPER SUBSTANCE OF THE BRAIN, previously suppurated and ready to form a fungus, protrudes: so it was in this case, and the fungus is represented in the sketch, fig. 13. The boy's condition, while he lived, is explained in page 671 of this work; the dissection of his brain exhibited, along with the general phenomena there described, the following peculiarities.

" The chief disorder lay in the right hemisphere of the brain, though it was in part communicated to the left *. The left ventricle was somewhat enlarged, its surface irregular and soft, with suppuration, while a dirty greenish-coloured pus lined the walls: The inflammation, thus communicated to the left side, was universally diffused: the substance of the brain, in its anterior part, remained natural; the cortical and medullary parts were distinguished by the usual colours and forms, but the substance of the brain, where it approaches either inflamed surface, the inflamed surface, viz. of the ventricle, or the suppurated surface of the hemisphere, assumes a dirty olive green colour, which muddy and dusky green is the prevailing colour of the inflamed or half-gangrened parts. Immediately opposite to the wide opening of the scull, all distinction of medullary and cineritious substance ceases; the brain has degenerated into a confused mass, which may be represented, in a drawing or a model, by a ground of olive green touched with spots of vermilion, like extravasated blood. The dura mater covering the right hemisphere of the brain was much thickened and leathery-like; its vessels conspicuous, red, and turgid, and coated with a tenacious coat of pus, greatly resembling and in some degree partaking of the nature of coagulable lymph; but there was much unequivocal pus spread over all the hemishpere, reaching even to the basis of the scull. The most difficult and interesting part of the anatomical inquiry was that which related to the state and origin of the fungus: It proceeded apparently from the membranes of the brain, from the pia mater; it was elongated from the surface of the brain in the form of threads, the remains, I presume, of vessels which gave consistence and strength to what in other respects resembled mucus. The dura mater was perforated, but not round the margin of the circle made by the trepan, as if wounded by the teeth of the instrument; the openings were round and centrical in regard to the naked part of the membrane, and were filled by the protruding parts of the fungus."

I should add, That in taking the cast from this boy's head, which I did with my own hand, not trusting to a figure-caster, the fungus stuck firmly to the mould,

* The description of the boy's condition, from the moment of the accident to that of his death, is from my own notes, p. 671. The more particular dissection of the protrusion or fungus of the brain, which is now described, is from additional notes, made by my brother Mr Charles Bell. The first exhibits a general view of the inflamed brain; the second, a particular anatomy of the protruding tumor. And I recollect it was my brother's chief intention to ascertain, by a careful dissection, whether the vessels of such fungus were continuous with those of the pia mater or brain.

in consequence of its vascularity and connection with the brain; it was then (in pulling away the mould) that the tumor lost its form, but not its vascularity, for its vessels hung in long strings through the several openings of the dura mater: the sketch, No. 13. represents the head of this boy in the moment of death. Surely he had been safer if left untrepanned: I attribute his fate to the large openings, yet without the shadow of blame on the part of the operator, who proceeded according to the strict rules of surgery, and took no bones away but such as were loose. It is nevertheless a question, and ever must be, whether he might not have survived had his wound, shocking as it was, been left to nature.

Eightly. One principle, relating occasionally to every form of fracture; to the depression; the angular and fractured wound of the scull; the mere rima or fissure; nay, even to the slightest bruise of a bone, is this—that every such fracture is apt to become CARIOUS. When, by carelessness or design, a fracture has been quite neglected, or imprudently treated; when, along with a fracture or fissure, the scull has been grinded and bruised by a carriage wheel, or grazed and deadened by a musket-ball; when the wound and the exposed bone has been much neglected or much tormented, by the ignorant surgeon, the fractured part becomes carious; when the wound becomes pale and flabby, the bone still seeming to the touch of the probe bare and rough, or in part exposed, yellow, duskish, or inclined to blackness; when the patient sickens and becomes languid, with a furred tongue, a hot skin, and a febrile pulse, and a corded feeling within the head—let the surgeon no longer show his humanity or skill, by watching his patient, but make haste to perforate the scull: if he perforate early, he will find but a little cream-coloured pus upon the dura mater, which will granulate and reunite with the inner surface of the scull; but if he wait but three days, the ulceration will affect the brain.

Let this, qualified with such exceptions as your own good sense and experience may suggest, be your rule of practice. It is not by neglecting depression, which never is in itself hurtful, but by disregarding a carious bone, and the slight but mortal signs of internal suppuration, that many patients are lost. A little boy, L—— D——, of the age of Cameron, in going to school, was crushed betwixt a cart-wheel and the wall, thrown down, mangled, and carried home with a wide and lacerated wound of the scalp, and a very slight depression of the bone. The scull of this boy is represented in sheet 3. fig. 14. The integuments were lacerated and turned back, so as to display an inconsiderable fracture and slight depression in the fontanel, where the coronal and sagittal sutures

cross; the wound was but slightly lacerated, the fracture by no means desperate, and the depression harmless, for the boy was composed and perfectly calm. The integuments were cleaned and replaced; and for three weeks the boy enjoyed perfect health, the wound granulating and appearing to heal. All along, his danger might have been prognosticated from the state of the wound; for though it granulated, it did not heal; the lips were florid, but separate; the lower surface was quite detached from the scull, the bone rough, and the edges of the fracture, rough and carious, encountered the point of the probe: But in the fourth week his danger was declared, and the affection of the brain begun; he was feverish, had acute pain in the head, had frequent startings and aguish shiverings, and passed his nights without sleep: Not only was the state of the wound overlooked, and the first signs of internal suppuration disregarded, but though, on the twenty-eighth day, his headaches were aggravated, though he was seized with convulsion, became paralytic of the left side, and his pupils were dilated, no anxiety was excited even by these decided signs of suppurating brain; he was immersed in the warm bath, had a glyster administered, and, *to revive him from this debility!* had occasionally A LITTLE PORT WINE! Two days had the boy lain in this condition, before the fracture and wound became a subject of attention; then the scalp was, by cutting a few bridles of adhesion which retained it, thrown back, the scull was again uncovered as at first; a fracture, with slight and general depression, was plainly perceived; but a much more dismal appearance, in my opinion, was the blackness of the bone, which, in all the depressed part, and to some extent around it, was now discoloured.

Though the child had long been distracted with severe pain in the head, had been struck with palsy, accompanied with occasional convulsions, and now lay oppressed, with a dilated pupil, it was with difficulty the surgeon was prevailed with to look upon him with any degree of interest; at last he was induced to perform the operation of trepan, but with what views I never yet could comprehend: The case plainly required the cutting out of the carious bone; under that surely lay the pus; but, to my utter surprise, I saw the crown of the trepan applied at a considerable distance from the depression, manifestly with the purpose of applying the trepan, first, upon the firm bone, and then introducing the lever by that hole, and raising the depressed part! though unquestionably a part, thus slightly and generally depressed, was sufficient to bear the instrument. A part thus blackened with caries should have been cut out, and not sound bone trepanned to spare that which was diseased; and surely whatever matter

was to be found, the surgeon had reason to expect under the carious part; for the caries, being the cause of such abscess, must have been the center or focus of it. In compliment to the rules of surgery, and in contradiction to plain sense, the perforation was made at (*a*), at a distance from this depression, over which the lever, when introduced, had not the slightest power. Next was made another perforation (*b*), which approached a little more boldly towards the depressed part: The first perforation (*a*) was actually at the distance of two diameters of the trepan from the edge of the fractured and carious part: the second crown of the trepan was placed at (*b*), betwixt the first perforation and the fracture. Both the perforations were made in the *sound part of the bone*, which bled in the vascular scull of a boy as the gums do when scarified, and over *the sound part of the brain*, so that not a particle of matter flowed. This second perforation, though in contact with the fracture, was as unavailing as the first in relieving the depression, the sole object of the operation: at last the perforation (*c*) being made upon the coronal suture, near the vertex, and through the carious part of the bone, the matter spouted out, and the operator and his assistant eyed each other with a smirk of exultation at their success, perhaps of congratulation in having lighted so accidentally, so fortunately, upon a cause of danger which they were little aware of. This last perforation should have been the sole object, the beginning and the end of the operation, as it at once gave vent to the abscess, and cut away a part at least of the carious bone: It was, I am sorry to say, neither the one nor the other; tooth forceps and lithotomy forceps were called for, and all the intermediate points of bone twisted and torn away, the trepan holes and the carious depression being converted into one wide and circular opening, as large as the palm of the hand; without any proper fungus having formed, the brain, (still covered by the dura mater) protruded in a general way, and soon, by sloughy orifices forming, (as in the case of Billy Cameron), a fungus began to protrude, which was duly powdered with alum, till the seventh day, when the boy expired.

The lesson which this case illustrates is one of the most necessary in surgery, viz. the duty of observing the state of the integuments, the caries of the bone, and the first slight symptoms of disordered brain, accompanied with separation of the integuments from the carious scull: the imprudence of making large openings is also conspicuous, and the propriety of trepanning the depressed bone wherever it will bear it, since, while in giving vent to the matter, we cut away the caries: and finally, I

would have you on every such occasion not to think merely of vindicating yourself by adhering to the strict rules of art, but to reflect on the use and purpose of your operation, and to do boldly for your patient's safety those things which sense and experience dictate. Such ABSCESS of the brain often follows a neglected fracture, and requires a *trepan* to open it, in place of a *lancet*.—These are, I apprehend, the chief rules for the treatment of depressed and carious fractures.

DISCOURSE

DISCOURSE II.

ON THE STATES OF CONCUSSION AND COMPRESSION OF THE BRAIN; WITH EXAMPLES NARRATIVE AND DESCRIPTIVE.

To treat fractures, wounds, and other open and manifest injuries of the scull, prudently and skillfully may be thought difficult; but how to reason concerning those internal injuries which are hidden from the senses, and marked only by variable and uncertain signs, must ever be perplexing. Perhaps there is nothing more generally desired by the profession than some decisive marks, denoting the particular nature of that stupor in which a patient lies oppressed after a fall or a heavy obtuse blow. But there is no such sign: we are doomed to proceed in our profession always with a degree of uncertainty, and to regulate our conduct by a perpetual and attentive exercise of our judgment and senses. It is only by a deliberate and calm review of the circumstances attending concussion, that we can arrive at any thing like a conclusion; and, in the course of reasoning, which I am now to lay before you, you will, I trust, feel the advantage of those general views I have formerly delivered; for it is my object now to make a parallel betwixt Concussion and Compression, the Apoplectic and the Paralytic States of the Brain; to establish in short the relation of Medicine and Surgery: To be surgeons, you must be physicians; and, even though educated as physicians, you must still make yourselves acquainted with the details even of that profession which you are not to practice. It is shrewdly to be suspected, that a physician, who boasts of knowing nothing of our profession of surgery, knows little of his own.

To reason upon the cause of every phenomenon in the living body, is natural and unavoidable, and does by no means contribute either to multiply or confirm whatever prejudices we may have: It is only from refusing to reason that our worst prejudices have arisen; and prejudices of ignorance are infinitely more dangerous than the prejudices of those who, being willing to reason, are of course open to conviction, and inclined to enter into the discussion of whatever new views or unobserved phenomena are brought to light. Nothing perhaps can be more unmeaning than the word *Concussion*, which is not, in the common acceptation, accompanied with any conviction of the structure of the brain being disordered by the shock, the term implies a belief that the affection is of the nature usually denominated *Nervous!* that it is inscrutable in its nature! that, as we know nothing of the immediate cause, we can do nothing to recover our patient! that whatever phenomena we observe, are such as are usually designated signs of debility; and from this persuasion, and an indistinct and confused analogy, (as Mr Abernethy observes) *betwixt fainting and concussion, stimulants and wine*, the most dangerous of all medicines, are poured down.

If Concussion be indeed this inscrutable nervous affection, unattended with physical disorder, we must become mere spectators; there is an end of reasoning, and in such uncertainty it were better to refrain from practice. But, the comparing the brain with other parts and organs of the body, will bring to our recollection many consolotary circumstances, which will encourage you to believe, that here also our profession may be useful. What does a bruise, a shock, and a general injury, do to a limb? Does it produce any sort of disorder in a limb, which it may not produce in the more delicate substance of the brain? When a man is hurt by the oblique blow of a cannon-ball, or has his thigh bruised by riding furiously against a carriage, by a fall, or by a log of wood, a block of stone, or any heavy body falling upon him, what does he feel? nothing but numbness: the part is torpid; he hardly knows how much he is hurt; he is lame; and we can hardly believe that any internal or physical disorder has taken place so suddenly! yet, before he is recovered from his confusion, or is able to mount his horse, the limb is stiff and swelled; the swelling increases every moment; the suffusion of blood, under the transparent skin, shows, by the speedy discolouring of the part, that the swelling, (too sudden to proceed from increased vascular action) proceeds truly from blood extravasated by the ruptured vessels, and there is no reason to doubt that the swelling in the deeper parts is from the same cause: The vessels of the limb have given way in many parts; its cellular substance is choaked with blood:

If the suffusion be so universal and so great as to suffocate the arterial action, the limb never recovers, all living action stops, it gangrenes and dies: If the blood be injected in such a degree as to create only pain and disorder, the arterial action is rather excited, and heat, pain, redness, and suppurative inflammation take place: If the blood be less generally injected into the limb, it is more easily absorbed, and the swelling is resolved without redness or pain. Of this suite of phenomena I must needs remind you, before proceeding, to observe in what degree these appearances take place in shocks or blows upon the head, and in what degree they are likely to affect the function of the brain.

OF CONCUSSION.

THE patient who has fallen from a great height, and lies insensible from the shock, has sustained the principal injury in that system of vessels which, from all that I have related to you, is the most delicate, and the most susceptible of extravasation. Nor is there any mark wanting of extravasation, slighter or greater, general or local, having taken place in the brain: Nervous affection (if we are still to use this unmeaning term) might, for a moment, confound the function of the brain, as a man is not only stunned but sickened by a blow of the fist; but the patient, who has suffered a concussion, lies insensible, snoring, and with his senses oppressed, and is in a state resembling that of apoplexy or intoxication; his forehead is swelled, his eyes often closed, and his features deformed with extravasated blood; blood gushes at once from his nostrils, mouth, and eyes; his pulse is slow and pausing; his limbs and joints loose and relaxed; the pupils of his eyes dilated; his breathing slow; his whole body cold; you hardly know that he is alive, but by his groans. If blood has thus burst from every part of this system of vessels, is it likely that the brain has escaped? If the blood-vessels of the nostrils, of the throat, of the ears, have burst from the shock, and blood is also effused under the skin, is it likely that the delicate substance of the brain should escape the same degree of suffusion? It is indeed true that, when the patient dies, and his brain is dissected in that coarse and slovenly manner, which is but too common, and by boys who hardly know its natural colour and forms, it seems as if nothing had happened to account for the sudden death of the patient; and it is confidently reported so, because there is no fracture of the scull, nor any conspicuous effusion of blood: but when

a brain thus deranged is dissected by a master who, by judging what is likely to happen, knows what to look for; the phenomena, though little perceptible to an ignorant man, must be interesting to a thinking observer.

"A man (says Mr Abernethy having fallen from the roof of a brew-house, a height of at least eighty feet, had his fall broken by touching the ground first with his wrist, which was dislocated and mangled; his forehead next struck the ground, and his face was bruised, but his cranium was uninjured: He lay at first almost inanimate, cold, and with a feeble pulse: when he became warm, he had stertorous breathing, a dilated pupil, and a profuse perspiration; his pulse rose to 140, he recovered a degree of sensibility, his pupil contracted, and his eye-brows were drawn into a frown; but his pulse again subsided; the animal functions gradually failed; he died the following day; and his head was dissected by Mr Abernethy, who reports the state of the brain in these words: "On dissection, there appeared every mark denoting violent inflammation of the brain and pia mater, of short duration. The minute arteries of the pia mater were turgid with blood; in many places THERE WAS THE APPEARANCE CALLED BLOOD-SHOT, which was also to be seen in the lining of the ventricles. Dark-coloured, and in some places bloody, coagulable lymph filled all the recesses between the tunica arachnoidea and pia mater. On dividing the substance of the brain, ALL ITS VESSELS APPEARED AS IF INJECTED WITH BLOOD."

Every word of this report, (more impartial than any I could relate on my own authority,) conveys the idea of turgescence of vessels, and general cellular effusion, throughout the whole substance of the brain, and makes good the parallel betwixt that state designated by the term Concussion of the Brain, and the benumbed and torpid condition of a limb whose arteries are burst and cellular substance suffused by a blow: It is not possible to imagine circumstances more suited to support the parallel than that suite of phenomena which takes place in concussion. Recollect fully the doctrine I have formerly laid down, and you will comprehend at once all the phenomena which distinguish CONCUSSION from COMPRESSION of the BRAIN. "Every cause which affects the brain universally through all its parts, as turgescence of its vessels, or general suffusion of its substance, interrupts and disorders its functions; while a partial compression, as that proceeding from depressed bone, extravasated blood, or any thing external to the brain, affects its functions very slightly, unless the compression, though local, is such as actually to cause death." The patient who has fallen from a great height, or otherwise suffered that shock

which so deeply affects the functions of the brain, is found, when lifted from the ground, cold, pale, motionless, without pulse, without sense, and is as in a fainting fit; if he continues cold, and passes his urine and faeces involuntarily, he dies. The first signs of returning life are deep and oppressed groans, the cold sweat breaking on his temples, and a fluttering motion in the pulses: when laid in bed, when warmed and restored to life, the groans become more frequent, he seems deeply oppressed, he tosses his limbs from time to time; his face is flushed, his nostrils dilated, his breathing laborious and noisy, his pulse slow and heavy, and he has all the symptoms of deep apoplexy: By the second day his pulse has risen to 120; his lips are parched, his skin dry, his eye more open; he stares wildly, but is insensible; and being roused, he, after a short and confused struggle, and muttering, as in low delirium, falls down again into a heavy slumber, from which, if bled and purged profusely, and his head bathed with cold vinegar, the surgeon having the good sense to refrain from giving opium or wine, he gradually recovers. It would appear, from this series of symptoms, that whatever general effusion takes place in the moment of the shock, is slowly absorbed; and that the febrile inflammatory action, which such a state of the sensorium excites, in the days immediately succeeding the fall, is harmless: Yet not unfrequently there is a true Typhomania; the pulse rises higher, and throbs powerfully; and the patient, after long tossing and oppression, starts from his bed, strikes and struggles with his attendants, and subsides again into a state of torpor; but by profuse evacuations, and bold prescriptions, escapes the danger of an inflamed brain, though the action sometimes terminates in continued insanity followed by imbecility.

These successive states, first of coldness and stillness in all the vital actions, with oppressed brain, and next of high arterial action, accompanied with delirium, have always struck me, as intimating strongly the parallel (so natural in every other point of view) betwixt a *contusion* of a limb, or of any other organ of the body, and *concussion* of the brain: Nor am I over anxious, when I find my patient quite insensible, lying in a state of stupor, resembling intoxication, if that first stupor be followed by arterial action and the signs of inflammation, for then I know the oppression is from no local cause: nor am I alarmed when he becomes delirious, for that is a state little more than febrile, which I have usually observed to be a sure forerunner of recovery; there is in such case nothing essentially to oppress the vital functions, or to cause death.

OF COMPRESSION.

When, in place of general suffusion and disordered circulation, some greater vessel has given way, and either under the dura mater, or in the substance of the brain, there is a particular effusion of blood, the scene is very different from that now described: The patient, oppressed by an effusion of blood, is never insensible, (unless he is about to expire), and rarely delirious; his pulse never rises, but is slow, heavy, and pausing at every fifth stroke; his pupil is sometimes dilated; his one side usually paralysed, or at least still and motionless, while the other often shakes with a sort of tremulous convulsion, which returns at regular intervals, and is attended with a quivering and irregular pulse, cold extremities, and insensible evacuations, when he is about to expire.

Extravasation more frequently arises from a blow or fall upon a hard body, and is more connected with fracture of the scull than concussion, which arises rather from a shock than a blow: Extravasation is more of the nature of a local injury: the patient, when raised up, is cold, pale, and motionless, but to this no usual heat ensues; he tosses as under some oppressive feeling, and often lifts his hand towards the injured side of the head; he lies with his eyes shut, groans as from oppression, but is always sensible; stares at you when roused; answers whatever questions you ask rationally, but in monosyllables: he seems impatient when teazed with questions; his answers are pronounced with a sigh or a groan; he is correct in answering to the circumstances of his fall, even to the nature of the oppression he suffers, and to the part of his head that is pained, towards which he moves his hand, though irregularly, whenever he is desired: in his tossing he sometimes rises upon his elbow; when requested to rise, he sits up, and takes the drink which he calls for, but soon sinks down again into a slumber liker sleep than apoplexy, and tosses and groans more as his sleep becomes deeper: The oppression and tossing is inseparable from this condition of the sensorium, and the pulse is slow, pausing, beating no more than fifty in a minute, and interrupted at every fifth or sixth stroke, especially while the patient is lying in deeper slumber, or when

in particular danger. I believe I have rarely seen a patient, to whom operation or any kind of assistance could be useful, quite insensible from mere oppression of extravasated blood; and of this I am very sure, that I have innumerable times seen the patient whose extravasation was so great as to prove fatal, such as was found upon dissection to cover one entire hemisphere of the brain, retain his perfect senses, and recollect minutely the circumstances of his fall, with a consciousness all along of every thing that was said or done about him.

I have just described a condition which, I would fain flatter myself, can hardly be mistaken, which at least is not likely to be confounded with the total stupor of concussion. IN THE FIRST DEGREE OF EXTRAVASATION, the person lying oppressed with extravasated blood, is not insensible, but tosses and groans from oppression, replies when spoken to, feels giddy, and, when able to express his feelings, says that every thing seems to turn round; he pukes from time to time, and has a slow, heavy, and pausing pulse: If you add to these signs, that, in his tossing, you perceive that one leg or arm still moves, while the opposite arm and leg lie almost still and motionless, you will seldom be deceived; and finding these symptoms to continue for days, the oppression to become deeper, the vomiting to cease, and the pulse to decline in strength, becoming slower as it becomes feeble, it is your duty to apply the trepan, and often you are successful. These are the signs of slighter extravasation, which yet without the assistance of the surgeon becomes desperate: for, in a few days, the side opposite to that which received the blow becomes manifestly paralytic; and as the extravasation and oppression of the sensorium increase, the palsy is followed by convulsion; while the one side becomes paralytic, the other is seized with slight tremors, and soon after the pulse becomes weaker, though it can hardly become slower, the natural heat declines, the patient expires: Wherever such convulsion accompanies the palsy, it is too late to operate.

IN THE SECOND DEGREE OF EXTRAVASATION, when the patient is paralytic, or completely oppressed, from the first moment, and there is no perceptible interval betwixt the paralysis of one side and declining of the vital powers; when he lies oppressed and moaning, raises his hand frequently towards his head, but is not deeply insensible, nor has the pupil much dilated; if he speaks, when teazed, though slowly and difficultly, and then in a particular manner raises his hand to his head, the evidence of extravasation is complete, the patient is in the utmost danger, the operation should immediately be had recourse to, and perforating with a large trepan, and giving vent to the coagulated blood, which rolls out thick and black,

sometimes relieves the palsy, restores the senses, and finally saves the patient's life.

But there is A THIRD DEGREE OF EXTRAVASATION, invariably fatal; and I believe the symptoms I am now to describe indicate in general, that extravasation which either expands itself over the lower parts of the brain, or extends from the upper parts to the basis of the scull, raising the nerves from their origins and distending them betwixt the basis of the brain and the foramina through which they pass out. The condition I have here to describe is that of total insensibility and grinning convulsion; an insensibility unaccompanied by stertor or snoring, but, on the contrary, with a pale face, cold extremities, and a fluttering pulse; a convulsion agitating not one side, but chiefly affecting the features of the face, jerking the head back, and stiffening the neck: The convulsion resembles that of the locked jaw; and it is very distracting to look upon such a patient, for the symptom brings an absolute conviction to the mind of the spectator that the disorder is fatal.

The patient's condition may be thus characterised; he is taken up cold, insensible, with a dilated pupil, and hardly any signs of life, and recovers heat very slowly and imperfectly: after lying oppressed, groaning, deadly pale, with a dilated pupil, the extremities cold, and the eye-lid remaining raised as you open it, unless you lay it down again, he begins on the second day to be affected with convulsive twitches; the cheek is particularly distorted, the whole body is still and cold; the convulsion increases in violence, and returns with a degree of regularity every ten minutes or quarter of an hour: at each return of the convulsion he continues, while you can count two hundred or more, to have the cheek and corner of the mouth raised, the eye-brow and all the features of that side violently distorted, with spasmodic twitches, the neck rigid, the head jerked violently round and bent backwards upon the neck, with interrupted strokes; and each convulsive twitch is accompanied with a catch of the respiration, a distortion of the mouth, and with a noise of *hick! hick!* repeated at each twitch, while the convulsion lasts. It seldom continues long: On the third or fourth day the convulsions grow weaker; the extremities and the whole body become cold; the pulse, which is not at all to be felt during the convulsion, trembles during the intervals, and the patient expires.

These two states of CONCUSSION and COMPRESSION bear a strong analogy with the relative states of APOPLEXY and PALSY. CONCUSSION, there is every reason to believe, is not a mere nervous affection, else it could not be permanent! but a suffusion into the substance of the brain, resembling the ecchymosis or bloody suffusion of a bruised limb, attended with symptoms resembling APOPLEXY, and terminating usually in a gradual absorption and slow recovery; some-

times in high inflammatory action and sudden delirium, in Typhomania, or rather that alternation of Delirium and Coma, which is almost inseparable from such a state of the sensorium : While COMPRESSION, proceeding from extravasation of blood, is plainly PALSY; beginning in stupor, without insensibility, and ending in Hemiplegia and convulsions : but, with this special distinction, that Palsy, proceeding from rupture of vessels overcharged by the *apoplectic arterial action*, is a disease of the brain itself, is attended with destruction of the cerebral substance, and is thence incurable ; while the Paralytic State, proceeding from a shock or blow, consists in extravasation, foreign to the substance of the brain, external even to the dura mater ; is merely a local compression, not directly injurious to the cerebral substance, and thence is curable : the moment the extravasation is let out, the patient raises his eyes, knows his friends, and moves the affected side. The truth or probability of these parallels will best appear from some sketches and narratives of such accidents as you are likely to meet with in practice.

Being called to Hamilton, to visit a gentleman, an officer in the 7th Dragoons, who was supposed to have a fracture of the scull ; I found that, in riding a wild horse, in the court-yard of the barracks, unaccustomed with the heavy bit of the cavalry equipage, he had checked his horse in rearing, and pulled him back, and the horse falling upon him, he was knocked down and struck to the ground with great violence, his occiput encountering the hard beaten gravel : He lay pale, pulseless, and insensible, was restored to heat very slowly, and continued in a profound stupor, snoring and motionless. I arrived the following day, and found him still insensible ; his pupil not dilated, his tongue furred, his hand hot and dry ; his pulse high, his face flushed ; his looks, when roused, wild and distracted ; he instantly, after being disturbed, fell down again into a state of stupor, and nothing could rouse him to any recollection of his situation, nor enable him to articulate even a monosyllable. Upon consulting with Mr Taylor the regimental surgeon, formerly of Mercer's Hospital, a man of the best education, and of strong good sense, we agreed, however unpromising his condition might pear to his friends, to report to Colonel Heul, That he was in no danger ; that we should make no incisions ; that, by profuse evacuations, this fever might be prevented from rising to delirium ; that, after slumbering a few days, he would gradually recover his senses. Presuming, from this infallible mark of quick pulse accompanying the stupor, that the stupor was void of danger, I left him with confidence ; and, by letters from Mr Taylor, had the comfort to learn that, after slighter dawnings of sense and reason, he was, by bleeding and

strong purges of calomel and jallap, perfectly restored, before the week had elapsed.

Concussion, in a greater or less degree, is almost inseparable from that kind of shock to which the head is exposed when a man is thrown from on horseback; sometimes it is accompanied with fracture or extravasation, and thence questions of great delicacy and difficulty often arise. The first head I ever dissected, after an accident of this nature, was that of a young gentleman, who having rode on a pleasure party to Roslin, exceeded in wine, was ill able to manage his horse, was thrown, and died on the fourth day: But in his scull was found not the slightest trace of fracture, nor within the slightest extravasation; nor could any peculiar appearances be remarked in examining the substance of the brain itself, except general redness of the pia mater, vessels extremely turgid, and many bloody points. Whence we perceive how narrowly those escape who have violent concussion; they invariably die, if the pulse continues low, or is at any time intermitting.

Another young gentleman, on his return from a like excursion, was thrown from his horse, lay in a death-like stupor for ten days, during which period the blood, which had at first gushed from his nose, mouth, and ears, continued to flow unremittingly from his right ear. The shock, which thus bursts the vessels on these delicate surfaces, cannot but have a like effect on the delicate cerebral substance within: The senses and intellect suffer from this suffused state of the brain, but the haemorrhagy from these vessels probably saves the internal part of the system from any extreme violence; at all events, it is certainly observed, that such issue of blood from the mouth and nostrils, though a sign of great violence, is favourable to the patient's recovery; and if any such haemorrhagy is dangerous, it is that from the ear, for there is little doubt that it must come from those internal vessels which traverse the ear: Yet this young gentleman entirely recovered.

In such cases, wine and the heat of exercise, youth, and health and strength, prepare the vascular system but too well to assume an inflammatory action, and to re-act powerfully; thence it often happens that, in place of lying like these young men, torpid and oppressed, the patient bursts out of bed, struggles with the attendants with maniacal strength, and is very difficultly subdued, and in great danger of ultimate violence to the structure of the brain from such high and continued vascular action. This I saw conspicuously exemplified, in a young man, uncommonly athletic, accustomed to violent exercises, who, being thrown from his horse when riding extremely hard, not brutally intoxicated, but furious with wine, lay

for five days in a state of profound stupor, from which he, after staring, struggling, and muttering, wakened to such a phrenzy that four stout men with difficulty held him down in bed, and yet he recovered, and reformed, and now lives in perfect health.

These familiar examples, such as you will daily meet with in practice, cannot perhaps be more happily closed than with a short case from Jacotius; it stands recorded in his commentary on the third aphorism of the first book of Hippocrates. "We have observed (says this author) of those who have the brain injured, some dying suddenly, others lying oppressed and snoring, while others have blood issuing from the nose, ears, and mouth, and yet live: One patient of mine having lain speechless a long while, and apparently dying in convulsions, started suddenly from his bed, in the middle of the night, fell upon the attendants with maniacal fury, and felled every mother's son of them to the ground, except a Franciscan monk, a lusty able fellow, against whom he maintained a long battle, with feet, and hands, and talons: the monk called loudly for help to those who were already felled, but in vain; they lay strewed on the ground, while he struggled alone with the furious patient, who seized alternately clubs, fire-irons, piss-pots, whatever he could lay hands on; and laying hold at last of an iron stanchel, he tore it from the window with incredible strength: He had now nearly levelled the monk with his fellow watchers, and would have beaten out his brains with a stone of forty pounds weight, which he lifted and aimed to throw at his head, when the monk, breathless and exhausted, but desperate, collected all his strength into one last effort, and gave him a kick on the cods, which brought him to the ground. This man, says Jacotius, I entirely and perfectly cured *." This example of horrible phrenitic delirium, I quote in proof of what I have constantly remarked, that delirium is the least unfavourable symptom and the most curable.

* "Nos observavimus, quibus cerebri partes sauciatae essent, alios repentè mortuos: alios soporatos cruentatis etiam auribus et naribus diu mansisse, tandemque evasisse: quendam Arelate, cum diu obmutuisset, crebrisque convulsionibus prehensus supremum, ut videbatur, diem conficeret, subito è lecto noctu exilientem, ac furore percitum in eos, qui aderant impetum fecisse, prostratisque aliis, cum Franciscano valente et nervoso, diu pugnis, unguibus, calcibus certasse, quem frustra caeterorum opem implorantem, ita miseris tractavit modis, ut arreptâ primum cruce, dende matulâ, fuste, ferro etiam incredibili vi è fenestris detracto, hominem non sine ejulatu penè oppresserit: ac certè sublate lapide quadraginta pondo, tandem oppressisset, nisi Franciscanus in summa desperatione collectis viribus ictum gravem aegri pudendis impegisset, quo ille humi concidit. Hic tamen praeter omnium opinionem nostris auxiliis adjutus tandem convaluit.—*Jacotius Comment. ad aph.* 3. *lib.* 1. *sect.* 3. *Coac. Hipp.*

The more fatal accident of extravasation is attended with symptoms less terrible, and with a comparatively slight affection of the intellect and senses: I have been confounded often to see the patient recollected and sensible, under a compression so decisive as to cause paralysis of one side: SOMNOLENCY, not STUPOR, is truly the mark of this state.

John Hutchison, a sailor lad, of twenty years of age, fell down stairs, and lay in a state singularly characteristic of compression of the brain: His condition was described to me by a good woman, who was very careful of him from the moment of his fall, for he was the companion of her son, who had followed him to sea; when the one boy was gone abroad, the other would not stay at home. This lad, on a visit to his father, perfectly sober, going negligently up an outside stair, fell, but whether three steps as a workman reports, or the whole flight as this woman's husband believes, we could never certainly learn: This good woman, who lived in the house under his father, was abroad at the time, but her husband heard the fall, so violent was the shock, and running out, carried him up stairs with the assistance of a mason who was working in the close. When she came home, she went up to him, and found him lying oppressed, as in a deep sleep; she asked him often what happened, and how he was, which he answered always in two or three words, passionately and impatiently pronounced, "that he was better," "that he would soon be well," "that he would lie and sleep a little," still he begged that they might let him lie still and sleep. His tongue sometimes faltered; he answered best when most roused; there was a cold sweat all over him; his face was exceedingly pale, he yawned perpetually, and always when offered drink, &c. cried, "let me lie and sleep:" He vomited frequently during the two first hours after the fall: his left side, his left arm at least, was plainly powerless, he never moved it in concert with the right: he lay in a slumbering condition, groaning and tossing as if oppressed; muttering, but always conscious of his condition; complaining of his head, and able to answer: When this good womanset hi m up in bed, or when he raised himself to pass his urine, he complained often of his breast and sometimes of his belly, but continually of his head: while quiet he had no snoring, and slept like a child, till after being bled by the surgeon of his ship, from which time he enjoyed no more of that placid sleep. On the third day, this woman brought him up a bason of warm milk, and he seemed to like it; she raised him in bed, he sat up and took the bason in his own hand, and when she gave it him,

saying, take it my good lad, he answered, " I will, I will, but do not trust to my hand only ;" yet, with her help, he held it to his head, and drank it off. He complained continually of his head ; and in whatever way roused or disturbed, he begged they would let him sleep ; " if they would let him sleep a little longer, he said he would go down to Leith and go on board."

This good woman went up to see him at seven in the morning of the fourth day ; she found him still slumbering, and continually complaining of his head ; suddenly he was seized with a strong convulsion, raised himself a little in bed, and thumped incessantly with his hand upon the side of the bed, striking with the paralytic arm as well as with the sound, and all the while he kicked and struggled with his feet ; at last his left hand was suddenly seized with a violent spasm, the wrist was strongly bent down towards the fore arm, the fingers stood out rigid at right angles with the hand, and from that moment he never moved that arm more, his hand continuing rigid in this distorted form. But the convulsion did not then cease ; it continued from seven in the morning till eight ; notwithstanding these terrible convulsions, and this spasmodic palsy of the left hand, he retained his senses, spoke sensibly when roused, supported himself in some degree in bed, complained sometimes of his belly and of his head ; and when asked about the state of his bowels from the time of his fall, answered collectedly and correctly. This was on Thursday, the fourth day from the fall : On Friday morning, I saw him, for the first time ; and in the evening by six o'clock he was dead.

In the last day of his existence, he still retained his senses ; he lay in a perpetual slumber, but had no puking ; his tossing and anxieties were very distressing to see ; his face was deadly pale, his right eye stood immoveable when opened, the pupil being widely dilated ; while his left (though his left side was paralysed) remained irritable and moveable, the pupil of it was contracted, and it turned quickly from the light ; his pulse was small, quick, and fluttering, like that of a sick child ; and the vital motions so affected, that it appeared manifestly that they could not go on ; his extremities were cold, and I judged him dying : but nothing surprised me more than to find, upon lifting his eye-lid, that I could rouse him to speak ; when I bade him put out his tongue, he did so, and when I spake loud and impressively, and asked where his pain was, he raised his right hand, though in an irregular way, and laid it upon his head."

" This very stout young man expired about six o'clock on Friday evening; and the following evening we found, upon dissecting his head, no tumor, nor even a bloody effusion in the integuments, but in the cranium a large and wide fracture, traversing the parietal bone, and running through its whole length: unconnected with that, on the vertex, was a small fissure, penetrating only through the first table: under the centre of the parietal bone lay a very large coagulum of blood; it was as large as the whole hand, bating the points of the fore and mid fingers, and thicker than the fleshy part of the palm; it was very firmly congealed, and came off in one cake like the placenta of a foetus, leaving a very deep depression in the brain, into which you might have laid the back of your hand."

It is not my intention, however useful it might be, to accumulate authorities for what I know to be a plain fact, or to multiply description of a state which I have given a sketchy outline in my general description, and which I would preserve clear and distinct: But I cannot refrain from quoting, on my margin*, one or two observations, to prove the same important fact of the intellect being little affected by extravasation, even by that which is to be fatal; while I go on to represent to you the condition of the patient while labouring under symptoms undoubtedly mortal.

* Fontanus relates the case of a boy having extravasation under the scull, in the following terms. " An orphan boy, about fifteen years of age, lost his tame sparrow, which flew away from him and lighted on a wall: The boy tried to entice the sparrow, and, failing in this, began to climb the wall; the sparrow flitted along, the boy followed, till at last he fell and struck his left temple; but he got up; and being asked by his playfellows whether he was not hurt, he fell a laughing, looking up waggishly to the wall from which he had the fall, which was fifteen feet high. He went to school as usual, and at supper he ate heartily, and then went to bed: but, at midnight, he awakened in the utmost terror, vomiting a mixture of bile and blood; before morning he was delirious. The governours of the hospital were called, who gave him every little assistance in their power. I, being physician in ordinary to the charity, was sent for, and in my turn called the surgeons. They examined, but felt no contusion nor depression of the cranium. I ordered him to be bled, to have a glyster, to have the head fomented. On the following day, a tumor appeared over the place of the temporal muscle; an incision was made in it, down to the muscle, and we found the scull bruised and fissured in various directions; yet there was no one piece which could be poised out: The trepan was naturally thought of, but was manifestly unnecessary, as the blood exuded through the fracture: when the free flux of the blood was stopped, we had recourse to the trepan, but with no good effect, for the boy died."

" A very old man was carried into the hospital, who, after a fall, lay insensible and convulsed: no relations accompanied him to tell what had happened: Two sons, who afterwards came, were at once brutal and perverse, seemingly indifferent to his sufferings, and yet sternly and impudently refusing to allow us to proceed in the way that prudence and the necessities of the case required. He was a very old man, with bald temples, a naked scalp, and not the slightest appearance of injury on the head: He lay in a deep stupor, immoveable, except when agitated with a convul-

Upon opening the scull, besides the fracture and these fissures, we found, on the very opposite side of the scull, two counter-fissures, of a triangular form, the cause of which we cannot pretend to explain. The dura and pia mater were tense as a drum, while the very capillary veins were so turgid that they resembled rather the veins of the hand than the veins of the brain; and betwixt the scull and the membranes was found much coagulated blood."—*Fontanus.*

" A coarse athletic man (says Wepfer) in cutting a mill-stone, fell from the gallery where he was working, at no great height; but he lighted on a beam, and struck the occiput a little behind the ear, upon the corner of the beam: he lay pale, cold, and speechless, as in a faint, and upon recovering complained only of pain on the occiput where it struck the beam. The beam being large and round, the surgeon found neither tumor nor sign of depression, not the slightest wound; the pained part could be covered with the flesh of the thumb, and was painful when touched: The surgeon bled his patient, applied his ointments, and put a twisted towell in his teeth, to try, by twanging it, whether there was a fracture; he gave him hard bodies to chew, and struck with an iron upon his teeth, as surgeons used to do to discover fractures. The patient walked about sometimes, sometimes sat on a stool by the fire; lay with his head low; never vomited; blood sometimes flowed from his mouth; in walking, he carried his head to the right side, with slight marks of the staggering vertigo (vertigo titubans); he had slight ringing in the right ear, but he saw well, spoke well, was silent only because it was his way; slept little, but had no delirium; ate little, but had no thirst. The pain of the affected part never remitted; but, with such slight signs, the surgeon, although a dexterous operator, could not think of trepanning. From the 25th to the 28th of November, he continued in this condition, when, about six in the evening, being in his entire senses, and with all his bodily powers perfect, he began to breathe with a sort of stertor, as if the bronchiae were clogged with blood or mucus, yet without dyspnoea; and, about eight o'clock, he lost in a moment all sense and motion, and in a quarter of an hour expired.

" On dissecting the head, there was found a slight depression, with fissure in the occiput, and upon lifting the scull-cap, two long and gaping fissures, and betwixt the dura and pia mater much black and congealed blood, and a proportioned quantity of serum, chiefly about the basis of the brain, extending round the cerebellum to the occipital hole, and round the cerebrum, even to the os frontis, limited entirely to the right side.—Vide Wepfer, ob. viii.

sion, which returned every ten minutes, and became more frequent as his strength declined; his eyes, which were closed during the interval of stupor, opened when the convulsion approached, and stood staring wide, with a much dilated pupil: first the cheek and features on the right side of the face were drawn up into a ludicrous grin; then the neck stiffened, the head was jerked backwards, and the jaws worked backwards and forwards with a violent spasm; the tongue and throat were also affected, and the lips made that kind of noise that follows when we draw the breath through the closed teeth, to prevent the saliva escaping by the angle of the mouth: after continuing two minutes or more, the convulsion terminated, with deep groans, in a state of stupor. His unnatural sons would not suffer us to touch one hair of his head; and on the evening of the second day, when he died, they came, with a mob of vagabonds at their heels, and carried away the body, with a degree of precipitation which inclined us to believe that there was something particular in the manner of this blow which they were afraid dissection might reveal."

Not a moment should be lost when such symptoms appear: The extravasation may be in the ventricles, on the basis, or within the substance of the brain; and if so, the man is gone beyond redemption; but if it be only on the surface, and there is a possibility of saving his life, it can be only by immediate operation: When the symptoms of extravasation are accompanied with fracture running downwards towards the basis of the scull, we may despair of doing good.

"A big and strong man, a common labourer, fell down three steps of a stair; but there was every reason to believe he had struck his head on the edge of a bucket, hitting that part where a projecting iron hinge joins the iron handle with the tub: When raised up, he was pale, cold, and pulseless; cordials were given him, he was restored to heat, and then blood was observed to distil from his nostrils and right ear. Being carried into his own house, he passed a disturbed and restless night, till towards morning that he enjoyed a calm sleep. He lay still and motionless the second day; his eyes seem dead and glazed, the pupils of both were dilated, contracting only with the very strongest light; his jaws seemed clenched, his teeth closely shut, his lips retracted and turned backwards, uncovering the teeth as in grining; he breathed slow and heavily through his nostrils; he was paralytic of his left side, had involuntary stools, and passed his urine in the bed.

"Yet upon being stirred and roused, he looked up wild and bewildered, and had frequently during the night attempted to get out of bed; his pulse was weak

and fluttering, and his body cold; he was not so insensible but that a purge operated briskly, though then and alway his stools past unconsciously: his face was pale and shrunk; he lay but a few minutes in one posture; he then turned and struggled, and a sort of foam issued from betwixt his closed teeth, while his lips were retracted into a grin; his cheek was distorted, and his jaws worked perpetually, so that you heard his teeth grinding. He was permitted to lie too long in this desperate state unassisted. When my brother and I saw him together on the third day, the paleness of the face and coldness of the body had increased, the stools were involuntary, the pulse extremely feeble, almost imperceptible; we called immediately a consultation, rather to witness what was to be done than to give advice in a case so plainly desperate: perceiving, though there was not the slightest swelling, a degree of livor on the temple, my brother made an incision, and, turning down a large angular flap of scalp and temporal muscle, uncovered the temporal bone down to the zygoma, and in doing so felt his knife grate against a rough and wide fracture; the flesh of the muscle being cleared away, a very rude fracture was seen to run horizontally through the parietal and temporal bones, its branches passed down under the zygoma to the basis of the scull, blood oozed through the chinks of it, and a large trepan being applied directly above the zygoma very black grumous blood rolled out. He died in about fourteen hours."

Your own good sense will suggest to you that, besides those decisive conditions of the intellect and bodily functions which I have endeavoured to characterise, there must be many intermediate states, extremely perplexing and difficult to resolve into any simple principle; in all things I wish to leave you to your own discretion; in many, I am sorry to say, you can have no precise rules from any teacher, but must trust to your own penetration and judgment: experience, or, in other words, the habit of reasoning, so as to infer from external signs the kind and degree of internal injury, will enable you to resolve the most anomalous symptoms; but that condition of the brain in which general suffusion of blood is followed by inflammation, delirium, and death, that condition which is marked by convulsions and spasms resembling those of Hydrocephalus, and with a pulse indicating nothing of oppression, is of all the anomalous states of the organ the most frequent. I cannot remember that I was ever more perplexed how to act than in the following case.

"A poor boy, of thirteen years of age, in scrambling with his playfellows, on a Sunday afternoon, about the ruins of a house which workmen were pulling down, fell from one of the windows, a height of fourteen feet, and struck his forehead a-

gainst a beam: There appeared upon the forehead, close to the root of the nose, a soft elastic tumor, and a general suggillation of blood, which entirely closed the eyes; he was stunned, and lay in a death-like stupor for a quarter of an hour, but entirely recovered: he had been universally bruised, for he vomited blood, which also flowed in a full stream from his nose; his pupil was contracted; his pulse, regular and strong, beating 90 in a minute. Next day the vomiting continued; his pulse was still full and strong: upon being bled the vomiting ceased, and the pulse subsided both in strength and frequency: the night he passed tolerably, though restless, feverish, and pained; he often carried his hand to his forehead, complained of the pain, and sometimes talked wildly through his sleep. The second night he passed in great confusion, with much delirium, and when most rational he complained grievously of his head, while a thin and bloody serum distilled from his right ear, with great pain behind the ear, where it would appear he had sustained a degree of injury, which might well happen in a fall so irregular among stones and beams. On the third day, the tumor of the forehead subsided, and the eye-lids opened: on pressing the tumid part of the forehead, he complained of intolerable pain; his pulse continued high and rapid; the bleeding, purges, leeches, and other sedatives, were renewed; his sleep during the night of the third was more composed and natural, and he had no unfavourable change, till ten o'clock in the morning of the fourth day; then he became very hot, feverish, and restless; vomited much; the vomiting was excited by repeating the cathartic, and even by taking the acidulated drinks which were ordered him; at four in the afternoon he was seized with extraordinary contortions, and strong spasms of the abdominal muscles, with violent tremors of the whole body, and grinding of the teeth: His breathing was affected by the violence of the spasms in the abdominal muscles; it was noisy and laborious, but not slow nor oppressed, and the pulse beat 120 in the minute: Towards afternoon all parts of the body were at times convulsed; he howled as if distracted with pain of the head, and his eyes squinted horribly; he grinded his teeth continually, his features were distorted, his arms and fingers stiffened and crooked with cramps and spasms: his condition this day and evening reminded me of the condition of boys in the worst stage of acute hydrocephalus or inflamed brain. At ten at night, he had, after suffering thus violently all day, subsided into a sort of stupor, without vomiting, but with a rapid pulse.

"The night of the fourth was restless and miserable, but much of it he passed in a state of stupor: On the fifth day the swelling of the forehead had entirely flattened; that of the eye-lids was gone; nothing remained to denote the place of

injury, but the general suggillation of blood with which the forehead and eye-lids were discoloured: At five this evening I found him quite sensible, complaining of excruciating pain in the head, screaming with the torture, and his eyes horribly distorted, especially the right one, which was turned downwards and inwards till the iris was almost hidden under the inner angle of the eye. This night he had much delirium, and while conscious complained of pain of the head, especially behind the ear; for though he felt pain of the forehead when pressed, he felt pain behind the ear and through the head at all times: he howled much this night from eleven o'clock, and his thighs were rigid and his toes crooked with the spasms.

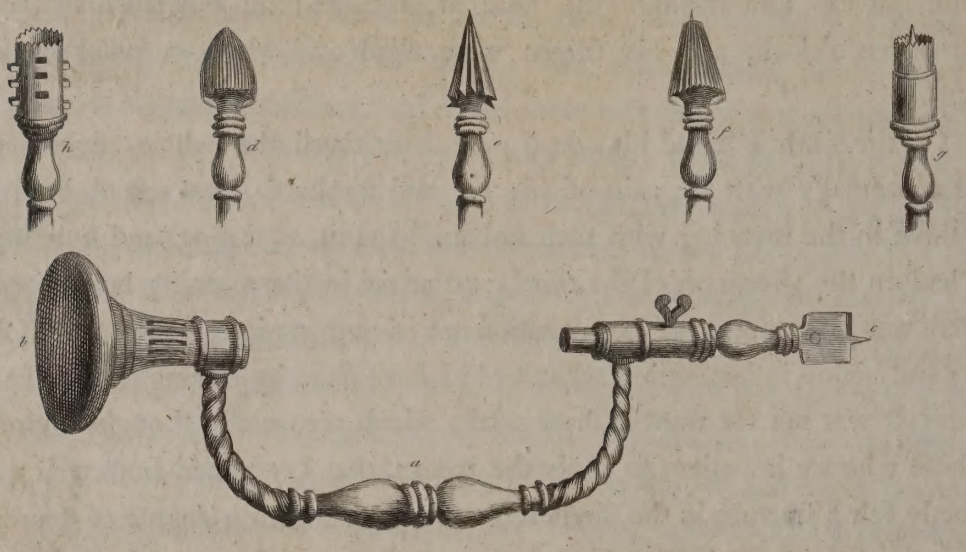
"On the sixth I found him dead; he had raved the whole night long, had cried continually with the pain of his ear and forehead, was seized betwixt two and three in the morning with such universal spasm, squinting, and howling as he had had on the afternoon of the third, and at six in the morning he expired."

Here was no symptom of extravasation nor of compression; none but of inflammation; and against inflammation what could I have done by tearing the scull with the trepan? It was not for want of those marks which are usually thought a vindication by those who are impatient to apply the trepan, that I refrained from ussing it, for I distinctly felt a fracture in the forehead, accompanied with a degree of depression in the place of the frontal sinus; but from a perfect consciousness that my operation could do no nothing but increase the inflammation, and from a persuasion that the fracture was a concomitant merely of a more fatal disease: I reflected seriously, and found myself assured, from the symptoms, that inflammation was the principal disease; that fracture at this point could be attended with no remarkable depression; that if it was extensive, it must run through the basis of the scull; and I had the satisfaction, melancholy though it was, of discovering, on dissecting the boy's head, not the slightest extravasation upon the dura mater, but the surface of the brain universally reddened, and its vessels turgid, and there was a wide fracture, beginning at the orbitary plate of the frontal bone, and running quite across the foramen magnum into the occipital bone; but without any remarkable appearance either under the bruised part of the forehead or behind the ear.

I will no longer detain you, but hasten, after a short section on the mechanical part of your duty, on the operation of trepan, to lay down rules for your general conduct, not without a confidence that, among the variety of delineations

of the disordered conditions of the brain, narrative or descriptive, which I have laid before you, you will be able to find rational parallels for a great proportion of the accidents which may overtake you in your future practice.

Exfoliating Trepans.



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Of the OPERATION *of* TREPAN.

At the head of this little chapter of instructions how to use the surgical instruments, I have placed those of a conical form, now obsolete; at the foot of it, those used by the modern surgeon: If you conceive, as I trust you do, the essential purposes of the operation, I have no fear of your using them with sufficient dexterity and address; and my instructions on this head shall be few, plain, and simple.

The instruments of the old school, represented in this plate, belong chiefly to the operation of exfoliating carious parts of the cranium, as those represented in p. 764; viz. the chissels, mallets, and googes, relate to the operation, now justly reprobated, of enlarging the openings made by these small and conical instruments, or breaking up the intermediate points of bone, so as to lay many perforations into

one. The instrument (*a*) is that which is distinguished by the name of TREPAN; and in using it the head (*b*) is pressed by the chin of the operator, while he turns the instrument, as a carpenter does his auger, with rapidity and good effect; but as I prefer deliberation in an operation of this nature, I use the trephine. The point (*c*) is that peculiarly designated the exfoliating trepan; for, by cutting off the surface without perforating, it shaves away whatever depth of the bone seems corrupted; and it is with such an instrument, though unquestionably endangering the dura mater, that the older surgeons completed the whole perforation. (*d*) and (*e*) are various forms of exfoliating trepans, designed for perforating the bone from point to point, in order to permit the granulations to shoot up through the outer table of the scull, and cover its surface when in danger of caries. (*f*) is that small trepan which was in use when Godfredus perforated the Duke of Nassau's head twenty-seven times, and is formed thus conical to prevent its perforating too rapidly, or passing in suddenly, so as to endanger the dura mater; while (*g* and *h*) are two forms of the crown of the trepan, in which any such accident is prevented by permanent or moveable stops, by projections of the crown of the trepan itself, or by pins laid across it, to measure the depth to which it is to be permitted to penetrate.

But we do not now prevent the integuments from reuniting with the scull, nor conceive exfoliation to be an essential part of the cure: the operator trusts to his address for completing the perforation, without plunging through the opening, hence the crown is made cylindrical, not conical, and sufficiently large to give a free issue to matter or blood without repeated perforations, or the help of chissels and googes. The simple form of the modern instrument marked (*i*), p. 833, turning in half circles with the hand, is found to perforate quick enough, and to be extremely manageable, since the saw is easily inclined so as to continue its semicircular incision on that segment or side of the perforation which is least cut. The forceps (*k*) take out the piece of bone, either by their circular lips (*l*), corresponding with the circle of the crown, being introduced into the circular cut to seize the sawed piece, or by the points (*m*) being introduced to poise it out. The lever (*n*) is sometimes useful in poising out the piece separated by the saw, but the point of it is too blunt and round to be very serviceable, in any but its proper office, which is to poise and raise up whatever depression of the scull requires to be elevated; and the levator and the forceps are equally used in twisting or poising out loose pieces of the scull.—These are the simple instruments now laid in the operating case; along with which

you are usually provided with a brush to clean the teeth of your saw; a second head or crown, of the same diameter with the first, that while the one is blunted, or when it is unscrewed for the purpose of being cleaned, the other may be used; a knife is also laid in the case, for dividing and raising up the scalp, and often a RUGINE or triangular instrument, like a caulker's iron, for scraping away the pericranium, which I never do, for I find it unnecessary, and do not think it right nor safe.

1. *For the disposition of your Instruments and Dressings*—They are to be laid in two small plates, within a doubled table-napkin, the napkin being pinned so over the bottom of the plate that it may not shift, nor any awkward accident happen: On the first plate is deposited, within the folds of the napkin, the trephine, the center-pin of the crown, the key to unscrew it with, the lever, the forceps, a toothpick, and a brush; on the outside of the cloth is laid a knife and sponge, soaked and squeezed, so as to be ready for use. On the plate of dressings are to be laid, lint nicely folded into smaller and greater compresses, very soft; a little square piece of oiled lint; a broad compress of four or six folds of old linen; a double-headed roller, three ells long, pinned at each end, so that when lifted, however hastily, it may not run down; and in the cloth that covers the plate should be stuck one or two needles, of the smallest size, threaded with a double thread waxed.

2. *For the Posture of your Patient*—If composed and sensible, and capable of sitting erect, you should place him on the ground, as a dentist places his patient: The assistant, who is to hold him, should have a board laid across his thighs, the patient's shoulders fixed between his knees, and the patient reclining his head upon a pillow laid upon the board; the assistant should lay his hands gently over the head so as to steady it, and in such a manner as to use, without change of posture, greater exertions if required: Where the patient lies insensible, he should be moved towards the side, or towards the head of the bed; his head laid on a pillow, steadied by a board under it; unless the couch on which the patient chances to be laid is itself sufficiently firm: a bed never is.

3. *In Cutting the Integuments*—The first step of your operation, you lift from the outer cover the knife and the sponge; the sponge, small and compressible, you hold in the palm of your left hand, under the ring and little fingers; you lay the mid-finger, fore-finger, and thumb of the left hand broad upon the scalp; you feel with the point of the left fore-finger, and by it guide your knife through all parts of the incision. *First*, If the scalp, having been once detached to a great extent, is re-

united, but over a carious bone and suppurating brain, the hollow integuments admitting the probe to turn to a great extent over the diseased scull---you take, in place of the round edged scalpel, a blunt pointed bistoury, and running it along, you at one stroke disengage the flap of diseased integuments, and turning it down see the whole extent of the dry, yellow, and blackened bone: your perforation should be central in respect to such caries. *Second*, The scalp having risen in form of a puffy tumor over a contused part of the cranium, you make, with the round edged scalpel, not a crucial incision, for that makes four small angles in the scalp, the raising up one or more of which displays but little of the diseased bone, but an incision in a tripod-like form; then the three points being dissected away from the scull make a very large opening, and even two only of the points being raised they make, as being two thirds of a circle, a very free opening: here too the state of the scull marks the danger to the brain; but in place of being yellow, rough, or blackened, it is usually only dry, not shining, nor brilliantly white, not attached to the periosteum or integuments; sometimes it is spotted or tinged with yellow, and devoid of circulation, and does not bleed when scraped with the point of the knife. *Third*, When after a dreadful fall, the scull is cruelly fractured, pieces beaten in, and the fissures wide, circumspection is so natural, and you can so distinctly feel with the point of the left fore-finger those asperities and openings, through which your knife might plunge into the dura mater, that I need but to intimate the danger. But, *fourthly*, When from a desperate fall upon the steps of a stone stair-case for example, the patient lies in a deadly stupor, cold, pulseless, moaning, the integuments never rise into a tumor nor become ecchymosed, except very slightly; they remain entirely flat for days, because the man is almost dead; the hemiplegia alone, with some slight blemish on the scalp, directs you on which side to operate, viz. the side opposite to that which is palsied, and from the convulsed or dying state of the patient you must do so quickly. The surgeon in such case, operating without a certain knowledge of the state of the scull, is in danger of plunging his knife unawares through a wide fracture. I have witnessed this disaster; let such incisions then be done carefully.

Allow me to add to these particulars a few general instructions. Do not seek to pursue the several limbs of a fracture, for to these your operation does in no shape relate; but seek the central point only, where the weapon or sharp stone has penetrated, or where the depressed angle is kept down by the firm and sound bone. Do not seek to scrape the bone, that you may trepan easily; I never, in

amputation or in trepan, found the soft parts entangle the teeth of the saw: In trepanning, I only cut away that cellular substance into which the extravasated blood is strongly injected, sometimes solidly impacted, and no farther than to procure a distinct view of the fractured pieces. Do not lay pieces of lint on the integuments, entrusting them to awkward assistants to hold them back while you perforate; for it is the sensibility of the integuments that makes the patient cry, resist, and struggle, which at once impresses the spectators with horror, and brings the reproach of cruelty on the surgeon, who must complete his operation in the midst of such cries: If you would avoid this unseemly scene, use spathulas or flat plates of iron, such as Mr Croker King calls defenders, to hold aside the integuments, and the perforation, which should be slowly and deliberately performed, will not seem tedious nor cruel.

In Perforating the Scull---Ascertain first the place most fit for perforation, viz. on the angle of depression, and in the line of the fissure where the fissure is wide and gaping: on the broken bone, if it be firm, on the sound, if it be so unsteady as not to bear the pressure of the center-pin, or the working of the saw; in the middle of the carious portion, when there is caries without fracture; and anywhere on the side opposite to that paralysed, but especially a little below and to one side of the centre of the parietal bone, when there is reason to believe the brain oppressed by extravasation, without any visible injury to mark the place.

Lift first the crown of the trepan you mean to apply; press it firm to the bone, and make one or two turns in order to mark the centre of the circle, by penetrating with the center-pin a little way: Next dismount the trepan head; take the triangular perforator, and having fixed it in the shaft, bore with it a central hole, for the center-pin, deep enough to hold it securely while you perforate: then mounting the crown of the trepan again, place the center-pin of it in that hole, and begin to saw: in cutting with the trephine, which turns in half circles, observe well the way in which the teeth are set, for they are set obliquely; you may be turning and twisting it, and that very vigorously, as I have seen some surgeons do, without cutting more than a right-handed person would pierce a cork by turning a left-handed cork-screw: as your trephine turns but half circles, you must inevitably cut deeper on that side of the circle towards which the hand turns; you must therefore probe frequently (especially when there is much bleeding, or when you are sensible of having cut deep) with the tooth-pick; and when you feel that you have penetrated on one side, CHANGE YOUR POSTURE, turn half

round the patient, which, by giving your hand a new inclination, sets it right for cutting what remains, which, in such delicate circumstances, and having so nearly completed the perforation, must be cautiously done and slowly.

In the course of perforating, while you probe with the quill, you give the crown of the trepan to your assistant to be brushed, or to be altogether changed; and when you are satisfied of the depth of your perforation, he, in returning it to you, wipes away the saw-dust with the same brush.

I seldom have completed the perforation, never have got out the trepan circle sticking in the crown of the trepan, but have sometimes poised it out with the handle of the scalpel, or the pointed extremity of the forceps marked (*m*). While sawing, whether in trepanning or in amputation, never think to overcome difficulty or resistance by pressure, but when you feel opposition cut lightly, and turn the saw nimbly, lighten your hand when it threatens to stop; never in sawing a long bone expect to loosen the saw by pushing and wriggling, but by withdrawing it, nor in trepanning by pressing onwards, but by turning the trephine half round backwards. Choose trepan crowns with the sides grooved and sharpened as well as the points of the teeth, for that kind of saw cuts wider as it goes deeper, and works the whole circle of the bone large and free for the trepan to move in.

5. *In respect to the Object of the Perforation*—You will find that extravasated blood rolls out spontaneously, in black and firm clots, through the trepan hole; and from dressing to dressing is easily hooked out, with an armed probe, or washed out with tepid water, the dura mater coming gradually into closer contact with the scull: Pus flows out still more easily, and multiplied operations for either purpose (of letting out blood or pus)are extremely imprudent; to repeat the perforation is sometimes necessary, on account of a great depression attended with manifest danger, where the edges of the depressed portion are fast locked under projecting corners of the firm scull, and the lever being introduced first into one, then into the other perforation, the depression is raised, but never without great force, usually a loud noise, and sometimes, as I have argued, with unjustifiable violence, insomuch that on many occasions, especially where the depression is flat, extensive, and having probably no offending points, I would rather leave it unreduced: Unless in depressions of a singular and dangerous form, punctured fractures, and those where, from their peculiar form, there is strong reason to suspect spiculae, I am not curious about depressions, nor over anxious in raising every point.

6. *In respect of Dressings*---I would intreat you to consult your own good sense, rather than hearken to the common ignorant advice of laying merely a piece of oiled lint on the wound, and over that a poultice. The old practice of cutting a circular piece of cloth as a syndon, and cramming it under the scull to support the brain, and leave room for matter and blood flowing out, I entirely disapprove of, but neither can I approve of leaving it quite unsupported; in short I dress the trepanned scull, as I do every other wound, nicely and careful: first, I lay the edges of the scalp smoothly together, sometimes stitching it with one or two points of the needle; then I lay upon it a small pledgit of oiled lint; next a small and rather firm compress of lint; next a general compress over the whole of that side of the head; and finally, I roll the head gently, but steadily and somewhat firmly, with a broad roller, and put over that a thin linen cap, lightly tied under the chin.

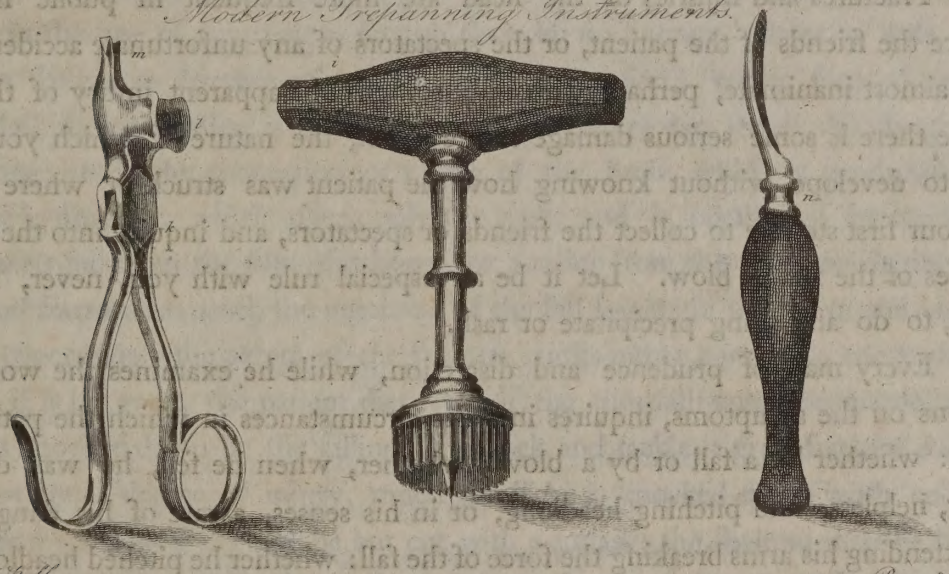
I allow no poulticing, except what is necessary to bring off the first dressings; and no washing nor curious cleansing of the wound, which I wipe slightly, and dress with very little ointment, almost dry: when blood still exudes, that makes an exception, being a special case; and when a fungus threatens to protrude, and even where only the sound but granulating dura mater projects through the trepan hole, I find it necessary sometimes to depress the dura mater, or push aside the fungus, to let the matter, confined from dressing to dressing, flow out; then, contrary to my usual practice, I think it right to dress morning and evening.

When, in the course of the cure, fungus protrudes and fills the opening, and the confinement of matter causes stupor and hemiplegia, and the inflammation of the brain, cries and convulsions, I reckon my patient lost; but I am proportionably more diligent in my methods of procuring a free efflux of the matter, and I think it better to shave off the protruding fungus than to apply escharotics, which I have usually found hurtful.

It is invariably found that noise, heat, wine, passion, and other exciting causes, are fatal to those who have suffered the operation of trepan: The confusion of a storm, after a battle at sea; the renewal of the engagement; the hour of firing the batteries in a besieged city; the intrusion of unwelcome visitors in the chamber of a private person; quarrels, intemperance, or venery, have in many instances brought on inflammation of the brain, such as has proved fatal to those far advanced in their recovery after this dangerous operation; therefore let them be

kept low, still, quiet, with a loose belly, a perspirable skin, little light, and few visitors, and no conversation but such as is composing and chearful.

Modern Trepanning Instruments.



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APHORISMS, or RULES OF PRACTICE, deduced from the foregoing Discourses.

WE have examined in detail every point of practice, and are now arrived at the conclusion of these Discourses, in which it is natural to recapitulate whatever is important, and ascertain whatever rules should particularly dwell upon your memory. This task, could I entirely acquit myself of prolixness in these discourses, might be spared; yet it will be useful, I doubt not, to explain in short Aphoristic Rules what an experienced surgeon would naturally do in any given case.

1. Above all things I counsel you to beware of precipitation; the only fault which can incline the surgeon to conceal the circumstances of his private practice, or leave upon his mind any lasting unhappiness: I intreat you on every new occurrence to think deliberately, judge soberly, and act gently; however urgent a case may seem, be in no haste to operate, take time to consult, and rest assured that Nature will often perform a cure while you are deliberating upon an operation; be also assured that you can never fail, in the worst cases,

to foresee the patient's death, by his coldness, paleness, convulsive motions, and involuntary stools: if these signs have not yet appeared, you have time for a few hours deliberate reflection, if they are already begun, you have then least of all any motive for precipitate measures, you are surely too late, the patient must die.

2. Fractures and injuries of the head are more frequent in public hospitals, where the friends of the patient, or the spectators of any unfortunate accident, leave him almost inanimate, perhaps with only some slight apparent injury of the head, while there is some serious damage to the brain, the nature of which you are ill able to develope, without knowing how the patient was struck or where he fell: let your first step be to collect the friends or spectators, and inquire into the circumstances of the fall or blow. Let it be an especial rule with you, never, in these cases, to do any thing precipitate or rash.

3. Every man of prudence and discretion, while he examines the wound and reasons on the symptoms, inquires into the circumstances in which the patient was hurt: whether by a fall or by a blow; whether, when he fell, he was drunk or sober, helpless, and pitching headlong, or in his senses, aware of his danger, and by extending his arms breaking the force of the fall: whether he pitched headlong over a rail, or tumbled down stairs, touching each step: whether he fell on plain ground, or on a declivity, and if he received a blow, whether it was struck by accident or by design; at arms length or close; with a heavy weapon or with a sharp one; by a feeble man or a strong; by a drunk man without aim or force, or by an angry man, in the height of rage, and with full effect.

4. There are certain kinds of accidents which import danger, each according to its peculiar nature; as A CONCUSSION, A CONTUSION, A WOUND WITH A SHARP WEAPON, A PUNCTURED WOUND. Writers on jurisprudence have long distinguished these kinds of wound, of which the danger is in some immediate, while in others it is deferred till the fortieth or till the hundredth day, and have been accustomed to affirm that the more the scull is fractured the less the danger, the breaking of the scull deadening the force of the blow. Of all the quaint reasons which authors have given *, not one is true; but yet it is a fact, that the man who has an

* The French surgeons have been accustomed to say, that the more the scull was fractured the less the danger: they imagined that the giving way of the scull saved the brain. One of their most celebrated surgeons says, If you take, for example, the stave of a barrel in both your hands, and try to break it by striking it on the ground, if it break by the blow, the shock terminates at the place where it breaks across, and you feel no unpleasant sensation; but if the stave continue entire and resist the force, the impetus with which you strike it upon the ground is reverberated to your hands, which are benumbed and pained.

extensive fracture of the scull escapes, while he who has no fracture dies. It is not because the yielding of the bone lessens the force of the blow upon the organ which that bone protects, but because concussion is a more dangerous injury than fracture, even though accompanied with deep depression of the scull: there is great danger in the case of concussion, though there be no fracture! there is little comparative danger in fracture when there is no concussion! when, from the nature of the fall, the concussion is great, no degree of fracture can lessen the danger, for the danger lies in the concussion or injury of the brain which is produced by a fall, not in fracture, which affects only the scull, and is occasioned by the blow. If a mason fall from the tiles of a house, or a sailor from the yards or rigging of a ship, and fracture his scull, the greatness of the fall lessens in no degree the violence of the concussion; the extent of the fracture marks rather a probable concussion, of which, if it be great, the patient dies: but if the tiles fall upon the mason, or the sailor is knocked down by the falling of a block and tackle, a great fracture does not cause an equal degree of injury, much less if he is knocked down with an handspike, and still less if his scull be but cut with a cutlass; the fracture may be in such cases great, and the concussion and consequent danger slight: in short, the scull is most fractured by those blows which are least injurious, and least injured by those general shocks which cause the most dangerous concussions and extravasations in the brain.

5. As a bruise is worse than a wound, and a sprain or laxation of a limb more distressing in its consequences than a fracture, so is concussion of the brain more dangerous than wounds or fractures of the scull: to the distinctions I have hinted at, I should wish to remind you of one which I have remarked: if by a fall your patient lie in a state of stupor, it may be from *Concussion*: if, after a smart blow with a bludgeon, not heavy nor depriving the patient instantly of his senses, it must be from *Extravasation*.

6. It is not with every kind or degree of stupor that an experienced surgeon is alarmed, he is accustomed to distinguish many kinds, as well as degrees, of that affection: the stupor may be that of *intoxication*, which, by the smell and the vomiting, he often is able to distinguish, and never is afraid to leave the head of the patient untouched till the longest period of intoxication (if it be intoxication) and all its consequences have expired; or it may be that of *slight concussion*, which, being attended with no oppression of pulse, nor suspension of breathing, is soon resolved by the natural force of the circulation: or it may be that stupor which, in

old age, generally follows a blow or fall, without indicating, as far as I have observed, any permanent injury: But if the *stupor*, though slight, is accompanied with *vomiting* and *a slow intermitting pulse*, there is reason to apprehend the most imminent danger.

7. Nor does every degree or kind of delirium alarm him: delirium, arising after stupor, is a favourable sign: A wound of the scalp is often followed by *erysipelatous swelling*, and a short and harmless delirium: A patient, thrown into an hospital with wound of the scalp, is often seized with sudden *rigors*, vomiting, high fever, and delirium, but these are the symptoms of *hospital fever* merely, and might as well be superinduced after a wound of the finger as after a wound of the scalp: One who has formerly suffered much from fevers, or *who has been insane*, is more apt, as I have known in several instances, to awaken in a state of *phrenzy*, after lying some time under the stupor of a blow: These are not dangerous cases of delirium; and though stupor, insensibility, rigors, and other marks of suppuration or of effusion of blood, may be motives for applying the trepan, DELIRIUM, as far as I can recollect or imagine, never is.

8. I believe the danger to be prognosticated is very nearly in this gradation: *Stupor*, though deep, and to the tyro seemingly very dangerous, is not a cause of immediate alarm to the experienced surgeon: *Delirium*, succeeding such stupor, shows that the vascular action is begun, and the oppression at an end. *Slighter somnolency*, free from stupor, in which the patient has his senses, (though inclined to sleep), but with a heavy, oppressed, and intermitting pulse, is extremely alarming, and requires the trepan: *Stupor*, accompanied with dilated pupil, and *palsy of one side*, indicates the most imminent danger, yet such as is often relieved by the trepan. Stupor, in which the *face is pale*, *the extremities cold*, *the pulse* not heavy and labouring, but *quick and fluttering*, especially if attended with palsy of one side, or slight convulsions agitating the features or the limbs, is a state altogether to be despaired of: yet perhaps it is even here our duty to operate, but without hope.

9. The *prognostics from tumors*, I must remind you, are still more interesting; for any peculiarity in the tumor indicating the death of the bone below, more certainly foretels danger to the brain than the most formidable fracture: *First*, Where the *scalp merely* is wounded, perhaps *punctured*, but no tumor ensues, the patient is often affected with spasms in the face, and the most ludicrous contortions of the mouth; this is a symptom much resembling that contraction which follows

the wounding of a nerve in bleeding, and, like it, requires an incision. I have at this moment, under my care, a little boy, of ten years old, who, having fallen over a stair-case in swarming the ballustre, was taken up apparently dead, has lain for two days in a state of deep stupor, is now entirely recovered from it; he has his mouth turned more entirely to one side than I ever saw it in a paralytic, and though able to run about among his play-fellows does not expose himself among them; this, I have promised confidently, (because I have often seen it) will go off.—*Secondly*, *Erysipelas* often seizes the scalp after slight wounds, extends over the face and ears, closes the eye-lids, is attended with smart inflammatory fever and delirium, but subsides in a few days.—*Thirdly*, *A bloody effusion*, if the blood be in great quantity and the effusion permanent, is sometimes dangerous to the scull; but I must remind you of a danger of another nature, viz. of a feeling as if of depression of the scull, so particular that even the experienced are apt to be deceived: But an experienced surgeon is in no haste to make incision into such tumor, even though the patient is vomiting, and in a state of stupor; these usually are but the first consequences of the injury, and, like the tumor, vanish. I have seen extravasation so extensive as to fluctuate from ear to ear, and yielding so as to admit the finger to feel depression of the bone, yet the whole has been absorbed.—*Fourthly*, The most portentuous tumor is the least formidable in appearance; for it is one which proceeds neither from extravasation nor inflammation; it is neither red, inflamed, fluctuating, nor extensive, but arising from the death of the cellular substance next the bone, and from the impossibility of the dead surfaces renewing their adhesion, thence it is *Emphysematous*, *puffy*, *small*, *circumscribed*, not painful: is accompanied with rigors or febrile shiverings, and starting or nervous tremblings; confusion of head, and feebleness of body and mind: it is the most desparate disorder with the slightest symptoms: suppuration of the dura mater is begun, and if, upon the slightest intimation of this kind of danger, the patient be not trepanned, he dies.

10. As your preceptor, I am much more jealous of your being found wanting in judgment than in skill: Your operations, I doubt not, will be performed with address, but I am truly anxious that your address should be reserved for occasions of real danger, and that the powers of nature should never be anticipated, nor interrupted, by any rashness of your's.—*First*, Be not too confident in promising a speedy recovery, even in slight and cutaneous wounds, for the bone, though not wounded, may be deadened by the blow; but lay the edges together, and stitch them lightly and

gently to procure reunion: dress the wound dry with lint, court-plaster, and a sprinkling of hair-powder, which, by caking with the blood, keeps the edges of the wound in close and nice contact: and watch your patient's condition constantly, especially where the wound has been made with a bludgeon, a stone, or any blunt and heavy body.—*Second*, Be not afraid of an open though apparently a desparate wound, even when the scull is cut or fractured, even "where the splinters of it lie pashed upon the dura mater:" there is in such a case undeniable danger, since the bone is wounded and all the parts inflamed which defend and lie in contact with the brain; but such open wound, though wide, is often less dangerous than a slight contusion; it is but *a compound fracture of the scull*, and you have no warrant for doing any thing which you would not do in *a compound fracture of any other part*: when I spoke of Pariée's operation on Captain Hydron, and of bone reuniting with bone, I meant but to illustrate a general doctrine, not to announce a rule of practice: I advise you, on the contrary, to pick away carefully every fragment of the scull, to dissect away whatever little fragments you may find adhering to the scalp, and to lay down soft and sound integuments only upon the wounded scull and exposed dura mater.---*Third*, Be not careless of cleansing the scalp and laying it nicely and smoothly down, because of my having proved to you that ragged integuments or scalp, having even its inner surface ingrained with mud and dirt, has adhered, for such proofs were but meant to illustrate a general principle, to show how tenacious both the scull and integuments are, of life and circulation: to lay them down ragged or foul were the height of presumption, and a most culpable carelessness; pick the surfaces, cleanse them with the sponge, do every thing to entitle you to success; when you stitch the lacerated parts together, do it lightly, and dress the edges dry; do not, in your anxiety to cleanse them from sand or mud, wrap the head in a poultice, expecting to unite the parts after suppuration is begun, for after suppuration they curl backwards and retract; they never, as far as I have seen, can be laid together again, but heal with a gap equivalent to an actual loss of substance: Having stitched the integuments, watch the state of the wound diligently, and the instant you observe the stitches overstrained by the swelling of the scalp, or can perceive that matter is confined, the bone bare, and the probe admitted under the diseased scalp, lay the wound open, and then use a poultice, and wait patiently the granulation of the naked bone, or the signs of internal suppuration, to direct your future steps. —*Fourth*, Be upon your guard against the irretrievable fault of making incision into the integuments when they are entire, however

distinctly you feel a fracture or depression through them, for it is wonderful how happily the hurt parts heal and the extravasation of blood is resolved when the parts are kept entire; the making an incision in such a case is converting a simple into a compound fracture, with all the dangers of it; nothing can vindicate you in taking such a step but the most unequivocal proofs of a concomitant extravasation of blood, viz. oppression, somnolency, a heavy pausing pulse, a dilated pupil, and palsy of one side: make such incision (the integuments I mean being uninjured) only after great deliberation in adults, and in boys never, or almost never.—*Fifth*, Be not too rash in entering upon an operation, merely because the patient lies in a state of stupor or breaks out into delirium; those are the cases which least frequently require the trepan: and when you are entered upon an operation, be not too particular in raising every point or piece of bone that either seems or is really depressed: but above all, be not too late in operating when there is reason to suspect a suppuration of the dura mater; make it a principle, whatever the occasion may be for using the knife or saw, to be *sparing of the integuments*, for the loss of them affects the scull, to be *still more sparing of the scull*, for it supports the dura mater, and to think with the utmost reluctance of *puncturing the dura mater* strong as the suspicions may be of blood being extravasated under it, for, like a second scull, this firm and strong membrane supports the brain after perforation, and when it is punctured the brain is deprived of all support, and I have never failed to see it protrude: I will not disguise from you that this operation of puncturing the dura mater is sometimes successful, that it is reported so by creditable authors, but it is my duty to warn you that I have always found it fatal.

11. In respect to the medical treatment of your patient, I must remind you, that the first moment of stupor, coldness, and paleness, requires cordials; but the reaction that follows, requires that the powers of the circulation should be repressed: and I must also remind you, that such accidents happen chiefly to workmen, vigorous, strong, and healthy, full of blood, and often in the prime of life, that though there are many who boldly deny the use of bleeding, they speak from theory, while none dare neglect it who are acquainted with practice: many times the patient lifts his eyes and moves his limbs while the blood is yet flowing from the vein, and many are thus recovered who otherwise would never move them again: Bleeding is useful in all contusions, falls, and blows, to arrest the progress of extravasation; but where extravasation has already taken place, and one side is palsied, blood should not be too profusely drawn away, lest the strength suddenly sink: the brain being already compressed and

the vital powers low, it is peculiarly dangerous to draw away much blood: In Concussion, which is an apoplectic state of the brain, consisting at once in fullness of vessels and general exudation, bleeding relieves the oppression and promotes absorption: in stupor, with a heavy pulse, throbbing gradually stronger and stronger, and increasing at the same time in velocity, bleeding must be used to prevent the reaction rising to delirium: and when delirium actually rages, and the patient starts from his bed, and strikes and struggles, it is most eminently required to save the organization of the brain from the intense action of its own vascular system: frequent bleedings, drastic purges of calomel, and cold applications, and cool air, are useful; blisters and opium, doubtful in their operation; and all other stimulants, as wine, volatile alkali, &c. quite improper.

I am now, gentlemen, to take my leave of you, which I do with this consolatory reflection, that I have endeavoured, sincerely and soberly, to fulfil my duty to you in every point; and indeed I trust that you share this feeling with me, and will not forget the hours we have passed together, nor find them unprofitable in your future course of practice. It is possible that the rules which I have just laid down for your conduct, in special cases, may have qualified, corrected, and defined many imperfect conceptions, and may serve to concentrate your more diffused knowledge, and make it practically useful. May I be permitted to wish, or to hope, in the simple and dignified words of Bacon, That Providence may have enabled me, through you, to become a means of alleviating the sufferings of our fellow creatures, and the miseries inseparable from human nature. "Quamobrem quum haec arbitrii nostri non sint; ad Deum Patrem, Deum Verbum, Deum Spiritum, preces fundimus humilimas, et ardentissimas, ut humani generis aerumnarum memor, et perigrinationis istius vitae, in qua dies paucos et malos terimus, novis suis eleemosynis per manus nostras, familiam humanam dotare dignetur."

FINIS.

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